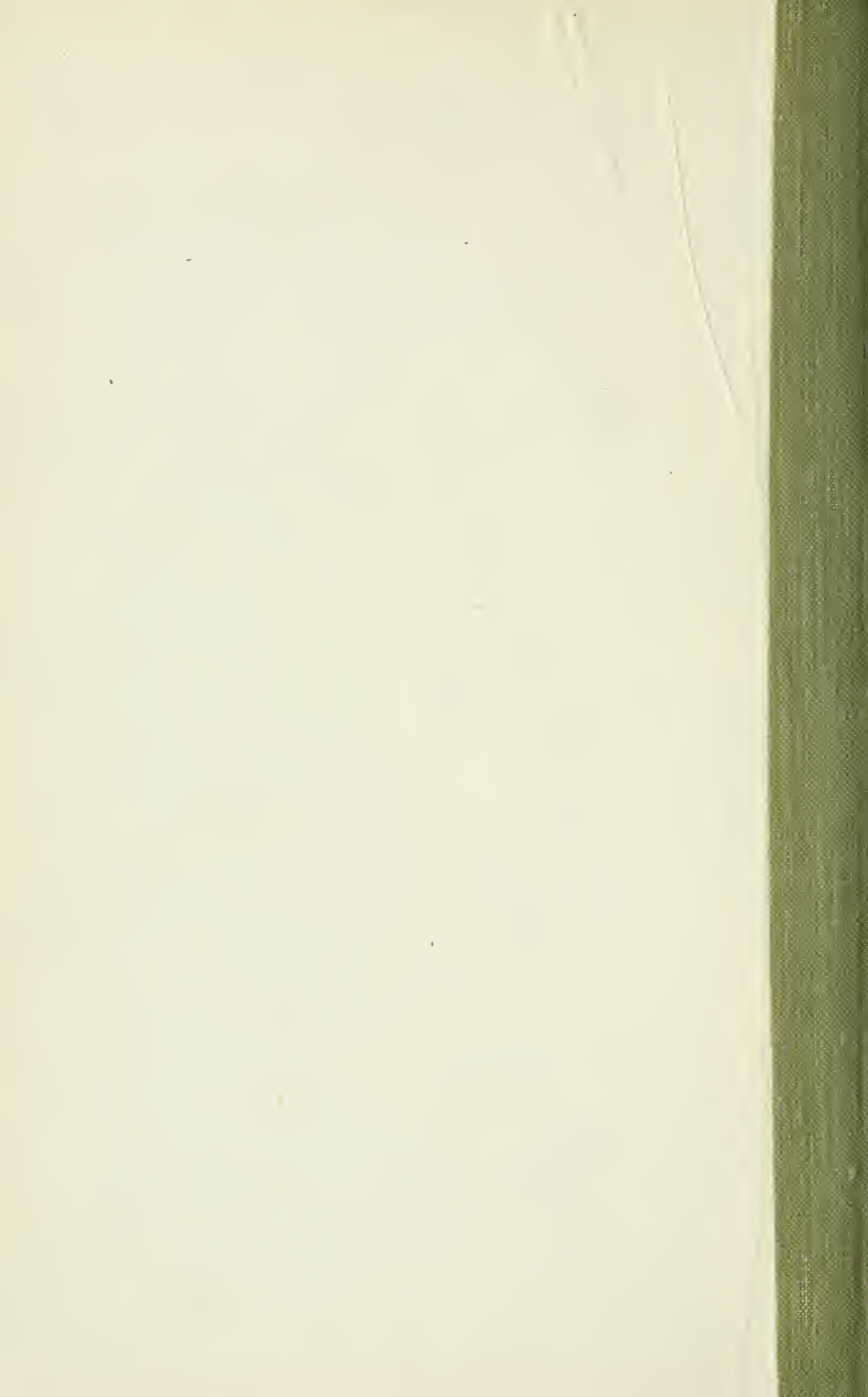


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The Journal of
Laryngology and Otology

The Journal of Laryngology and Otology

EDITED BY
A. LOGAN TURNER AND J. S. FRASER

FOUNDED IN 1887 BY MORELL MACKENZIE
AND NORRIS WOLFENDEN

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The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

EDITORIAL

WITH the issue of the present number, the *Journal of Laryngology, Rhinology, and Otology* enters upon the thirty-fifth year of its history. Founded in 1887 by Morell Mackenzie and Norris Wolfenden, as the *Journal of Laryngology and Rhinology*, with the object of stimulating and fostering an interest in the specialty and for the purpose of providing an abstract of the most recent literature dealing with diseases of the throat and nose, it fulfilled its function, in this respect, for a number of years. In 1892 "Otology" was added to its title-page, Dr James Dundas Grant assuming responsibility for this section of the work.

During the thirty-four years of its existence, the Journal has had to contend with difficulties both editorial and financial, but, in spite of such, there has been no interruption in the regularity of its appearance, and it has continued to contribute to the current literature of the specialty.

After war broke out, the Journal, like other similar publications, suffered from the stress of the period, but largely through the untiring energy and the efforts of its Editor, assisted by a small but loyal band of co-operators, it weathered the storm. Dr Dan M'Kenzie, after acting for nine years as Editor of the Journal, has asked to be relieved of his responsible duties. In vacating the Editorial Chair, he takes with him the good wishes of all readers of the Journal, along

Editorial

with their sincere thanks for the time and thought which he has devoted to its interests and for the work which he has accomplished. The profession owe him a debt of gratitude which they can best repay by giving increased support to the Journal which he has so faithfully served.

In the light of Dr M'Kenzie's retirement, the Editorial Committee, after careful consideration of the whole matter, have come to the conclusion that the occasion is a suitable one for effecting a change in the management of the Journal. Accordingly, they have purchased it from Messrs Adlard & Son, and West Newman, who were not only the publishers but the owners of the Journal. The Journal, which now appears under the title *The Journal of Laryngology and Otology*, has become the property of the profession. Its conduct has been placed in the hands of two Editors, and its publication has been entrusted to the well-known publishing house of Oliver and Boyd, Edinburgh. It is hoped that under the new regime it will receive a fresh lease of life, and that an increased effort to further its prestige will be forthcoming on the part of all who are interested in the future progress of Laryngology and Otology.

While no radical changes in the scope and policy of the Journal are contemplated in the meantime, a definite attempt will be made both to enlarge the *terrain* from which contributors to its pages will be drawn, and to add to its sphere of usefulness. The area from which contributions are invited must not be restricted by the waters which girdle our island shores, and an appeal is made to our confrères beyond the Seven Seas for their practical support and assistance. It should not be impossible for Great Britain and the Overseas Dominions to maintain at least one Journal which will be thoroughly representative of the work of one great section of the English-speaking peoples.

The educational advantages which a journal can offer are not inconsiderable. Instructive information may be placed before the reader in a variety of ways. An occasional Editorial dealing with a scientific subject, or with matters which concern

Editorial

the education of the specialist, may supply a means of instruction. Abstracts of papers from current literature bearing not only on the specialty but relating to developments in general medicine and surgery which may be indirectly relevant to the throat, nose, and ear, may be made a useful source of information. The clinical histories of the more interesting cases as they occur, month by month, in the various clinics, are worthy of being put on record. Summaries of recent advances in the form of Critical Reviews, provide a more interesting and comprehensive way of studying a question than that obtainable through the perusal of a number of individual abstracts.

Original contributions, however, must continue to form the basis of a successful periodical, and with the increasing number of workers in the specialty, both at home and in the Dominions, we may look confidently for a larger and a more valuable output. The fact should not be lost sight of that every advance in the attainment of scientific knowledge has not been made by laboratory research alone. Some of the great truths, both in medicine and in our own specialty, have not been elucidated by such means, but by careful and patient clinical observation in the out-patient departments and wards of the hospitals. Neither time nor opportunity, nor the special bent of mind which is required for laboratory research, are given to everyone. To such of the younger men who may be thus gifted, every facility should be offered to encourage them along lines of scientific investigation, and the Journal should become the recognised medium for publishing the results of their work. From the riper experience of the older men, with the many clinical opportunities at their disposal, it is reasonable to expect that the Journal should profit. Clinical experience is within the daily reach of the majority of us. The great mass of material with which we deal, week after week, should be utilised to much greater advantage in the future than it has been in the past, and very valuable collective information acquired in this way.

In the special departments of the large General Hospitals, particularly in those connected with the teaching schools,

Editorial

facilities for team work should be offered to the staff by the surgeons and physicians in charge. This should be undertaken not only within the special department itself, but in conjunction with the other departments of the hospital, whenever additional assistance is required for the more complete investigation of a subject. A closer alliance between individual workers and groups of workers in different departments would do much to develop further progress, and would result in placing upon a broader basis our conception and knowledge of disease as it affects the special area in which we work. British Laryngology and Otology would be enriched by the acquirement of such knowledge, and the position of the Journal as the vehicle for conveying the information to its readers would be enhanced. It is in the hope of stimulating the workers in the specialty to an increased effort that the first number of the Journal under its new management is presented to the profession.

A. LOGAN TURNER.

CHORDITIS FIBRINOSA.*

By A. BROWN KELLY, M.D., D.Sc., Victoria Infirmary, Glasgow.

THE object of this paper is to direct attention to an uncommon variety of acute laryngitis characterised by the deposition of fibrin and the occasional formation of erosions on the vocal cords. All of my cases occurred in soldiers, and neither before the war nor since two months after the Armistice have I met with a case of the kind. The rarity of the affection amongst civilians seems unquestionable from the absence in the principal English text-books of any description corresponding with the undernoted appearances.

Material.—During four years and eight months' service (August 1914 till May 1919) in the 4th Scottish General Hospital, Glasgow, 113 cases of laryngitis were treated by me, 40 of which presented exudation or erosions, or both, on the vocal cords. The first case was seen in November 1915, the last in February 1919.

Season.—The disease set in during the cold season between 1st October and 31st March, with the exception of 2 cases in May, June and September respectively; 5 of these six had been gassed.

Symptoms.—Nearly all of the patients suffered from hoarseness or aphonia; the latter symptom was present chiefly in men who had been gassed. A few coughed. None complained of pain in the throat.

Causes.—The causes assigned for the disability were: gas (23), cold (10), influenza (3), shouting commands (1), and coughing (1). In two cases no cause could be given.

Appearances.—In a recent and pronounced case of chorditis fibrinosa the vocal cords are of a pure white appearance excepting in their posterior third and over a small area quite anteriorly, both of which are red (Fig. 1). At first, one may mistake the white patch for the normal cord, but further examination and the subsequent course show that it is due to a deposit which gradually passes off, leaving exposed the red upper surface of the cord. When this process of resolution has advanced a little, the affection assumes its most characteristic aspect. The patch

* The author is indebted to Mr Thornton Shiells for the drawings which illustrates the paper.

A. Brown Kelly

on each cord has then a somewhat semi-oval shape, and on adduction the oval is completed, its long axis coinciding with the glottis. The middle of this axis corresponds with the middle of the ligamentous part of the cord, or the junction of the anterior and middle thirds of the entire cord. The fibrinous deposit by degrees loses its lustre and becomes thinner and greyish. Its extent may remain about the same for a fortnight, and then in the course of three days it may entirely disappear. Oftener, however, it clears up from the periphery inwards, so that the red area at each end of the cord lengthens, and the two become connected by a gradually widening red tract to the outer side of the patch. Later, the exudation appears as a narrow line at the edge of the cord, and it is last seen as a small white dot at the middle of the ligamentous cord. The changes on the two cords generally proceed *pari passu*.

The original extent of the membrane may vary considerably in different patients. Instead of covering nearly all the ligamentous cord as already described, it may be limited to a small area around its middle point, as in the last stage of a pronounced case. Between these two extremes plaques of various sizes may be met with.

Rarely the cords are involved asymmetrically.

In two cases membrane was found on one cord only.

Apart from the involvement of the true cords, the larynx presents a normal aspect.

The average duration of the fibrinous exudation, assuming that it forms about the time when the voice becomes affected, is from three to four weeks. The voice, as a rule, is normal earlier, while the redness of the cords persists longer.

Erosions.—Erosive action is seen in about half of the cases of chondritis fibrinosa, usually in the later stages. One or several tiny notches form in the edge of one or both cords near the junction of the anterior and middle thirds; generally they disappear in three or four days (Fig. 2).

Chondritis Fibrinosa contrasted with Exudative Laryngitis due to Mustard Gas.—Although in a considerable proportion of the cases of chondritis fibrinosa the men had been exposed to gas and suffered from conjunctivitis and bronchitis as well as laryngitis, I do not regard the exudation on the cords in this affection as solely or directly due to gas. When mustard gas definitely affected the interior of the larynx—as observed in other six cases—an entirely different picture was produced.



FIG. 1.—STAGES OF RESOLUTION IN CHORDITIS FIBRINOSA.



FIG. 2.—EROSIONS OF THE VOCAL CORDS IN CHORDITIS FIBRINOSA.

Chorditis Fibrinosa

The patient complained of painful deglutition, and on inspection irregular patches of white deposit were found oftenest on the posterior surface of the epiglottis, occasionally on the arytenoids and aryepiglottic folds, less often on the false cords, but never on the true cords. At the same time a patch usually covered more or less of the posterior pharyngeal wall, and smaller deposits might be seated on the palate and faucial pillars. The membrane in the larynx disappeared within a fortnight from the date of exposure to the gas; that in the pharynx, being thicker and more extensive, took a week longer to clear away. The duration in the larynx of membrane caused by mustard gas is thus much shorter than that of the exudation in chorditis fibrinosa.

Treatment.—The chief treatment consists in resting the voice. If this is neglected, or if, after the correction of a functional paresis of the cords, which is not uncommon in these cases, improper voice production is persisted in, the congestion of the cords and hoarseness may be maintained.

Pathogenesis.—In a paper published in 1890 on affections of the upper air-passages in influenza, B. Fränkel¹ described dirty white areas on the reddened upper surface of the vocal cords. He assumed that these patches were due to fibrinous infiltration, and regarded them as almost pathognomonic of influenza. Since then a few British writers, *e.g.* M'Bride, Watson-Williams and Tilley, have mentioned the occasional ulceration of the vocal cords in influenza. A lengthy review on fibrinous laryngitis by O. Seifert² appeared in 1916, in which it was pointed out that the term laryngitis fibrinosa covered a large number of affections of different aspect and etiology, including that under consideration. The writer therefore proposed the designation chorditis fibrinosa for the variety characterised by the formation of white plaques—presumably fibrinous—on the upper surface of the vocal cords, the rest of the larynx being apparently normal. This recommendation in nomenclature is likely to meet with general acceptance and has been adopted in this paper.

The description of chorditis fibrinosa given above agrees largely with Seifert's, but on some minor points our experiences have differed. Thus he does not appear to have met with erosions or ulcers at the site of the deposit as here reported, nor with a case in which one cord only was involved. Further, in all his recent cases he found a more or less pronounced degree of rhinitis sicca or rhino-pharyngitis sicca, to which he attaches

A. Brown Kelly

etiological importance, whereas this condition existed in only one of my patients.

As to the pathogenesis of chondritis fibrinosa, our respective conclusions are entirely at variance.

Seifert appears to have taken for granted the influenzal nature of the affection. He maintains that it occurs exclusively in, and is typical of, influenza. He does not consider, however, that its development is dependent upon the severity of the infection, the amount of general disturbance or the degree of laryngitis. He states that one has often the opportunity of seeing recent cases in which the signs of inflammation are insignificant, while in others marked redness and swelling of the entire laryngeal mucous membrane are present. In his experience the formation of the fibrinous deposit takes place on the third or fourth day of the influenza and manifests itself by the sudden onset of hoarseness. By this time the general symptoms may have almost subsided, so that the patient is able to call upon the doctor. In other cases in which the general symptoms had been fairly severe, but convalescence had set in, he found the fibrinous exudation developing only on the eighth or tenth day, although the patient had been moderately hoarse from the beginning of the illness. He has seen chondritis fibrinosa very exceptionally in females—in neither sex under the age of 20—and chiefly in men between 25 and 50. This striking predilection of middle-aged men possibly points in his opinion to the existence of predisposing causes in other parts of the upper air-tract. In almost all the 38 soldiers with chondritis fibrinosa whom he examined during the first year of the war, dry catarrh of the nose and throat was found; the prevalence of this disease may have arisen from conditions in the barracks. Dry catarrhs of the upper respiratory passages, although not directly responsible for chondritis fibrinosa, are to be included, he thinks, amongst the factors favouring its development.

Chondritis fibrinosa may be due to influenza, but that it is always so and synonymous with influenzal laryngitis appears doubtful, even from some of Seifert's statements. In my experience a connection was exceptional, for in only 3 of the 40 cases was the aphonia or hoarseness said to have followed influenza. In some of those attributed to "a cold," influenza may possibly have been overlooked, but in the majority it could be excluded. While unwilling, therefore, to accord this disease the etiological importance hitherto claimed for it in chondritis fibrinosa, one

Chorditis Fibrinosa

cannot deny that the laryngologist ordinarily has few opportunities of inspecting the vocal cords in influenza or in acute laryngitis accompanied by constitutional disturbance; still this fact scarcely explains the rarity of chorditis fibrinosa in civilian patients. It is more likely that the comparative frequency of this affection in a military hospital is accounted for by the severe and exceptional conditions to which men are subjected while on active service.

Among the predisposing causes of laryngitis incident to the battlefield, are: shouting, panting respiration, violent exertion with subsequent exhaustion, and all that is involved in a death and life struggle. The inspired air may be cold, raw, and laden with irritating gases, exciting violent coughing—as already stated the affection was met with chiefly during the winter months. There may also be overuse of tobacco and alcohol. Some of these factors in a milder degree come into play on the training ground and at home, and account for the few cases that developed the disease in this country; the majority, however, were sent from the front as having been gassed.

A consideration of the local appearances, I think, throws light on the nature of the affection. The entire vocal cord is involved, but the white deposit is confined to the ligamentous part, *i.e.* the part that vibrates. The posterior third and a small area anteriorly at the attachment of the cord, both of which vibrate but little, if at all, are red and not covered by membrane. As the affection progresses towards recovery the white patch grows gradually less from its periphery inwards, so that before disappearing altogether it is reduced to a mere speck at the middle of the ligamentous cord close to its edge.

This point on the cord is that at which the maximum vibratory movement takes place. During phonation this point not only vibrates in a horizontal and vertical plane, but is pushed inwards so as to come into contact with the corresponding point on the other cord. It is, of course, at these points that singer's nodules develop.

Summarising these observations, it would therefore appear that in consequence of certain noxious agents, notably cold, gas, tobacco, and occasionally the influenzal virus, acute inflammation of the vocal cords is caused. Owing to exceptional factors, particularly shouting and rapid respiration, a damaging effect is produced especially upon the vibrating part of the cord, and necrosis of the superficial epithelium results. A fibrinous exuda-

A. Brown Kelly

tion representing the process of repair takes place over the area so destroyed. The extent of both the necrosis and the resulting fibrinous deposit corresponds presumably to the severity of the process, and may vary from a small patch at the centre of the edge of the ligamentous cord to one covering this entire region. In all cases the former situation is evidently that at which the process is most intense or the aggravating conditions most active, for there the patch persists longest. Briefly, chondritis fibrinosa appears to be a variety of acute laryngitis in which the inflammation has been limited to the true cords, the ligamentous portions of which have suffered specially owing to excessive vibratory movement.

REFERENCES.—¹ Fränkel, B., *Verh. d. lar. Gesellsch. zu Berlin*, Bd. i. S. 30. ² Seifert, O., *Arch. f. Lar.*, Bd. xxx. S. 83.

ANGEIOMATA OF THE LARYNX.*

By IRWIN MOORE, M.B., C.M. Edin., Surgeon to the Hospital
for Diseases of the Throat, Golden Square, London.

*A Study of all the Cases recorded in Literature, with Special Reference to the
Question of Hæmorrhage and Treatment of these Tumours.*

A RECENT case, shown at a meeting of the Section of Laryngology, Royal Society of Medicine, has drawn attention to the extreme rarity of these tumours of the larynx. Lennox Browne¹ has described these growths as the rarest of all benign tumours of the larynx.

STATISTICS.

Morell Mackenzie,² in 1871, published 100 consecutive cases of benign growths of the larynx.

ERRATA

The first nine references on pp. 11 and 12 of January issue should, in order to correspond with those given under Abstracts of Recorded Cases and Bibliography, read as follows:—

- | | |
|--------------------------------|-------------------------|
| ¹ Morell Mackenzie. | ⁵ Chiari. |
| ² Fauvel. | ⁶ Jurasz. |
| ³ Heinze. | ⁷ Schmidt. |
| ⁴ Wolfenden. | ⁸ Schrötter. |
| ⁹ Lennox Browne. | |

had operated.

Norris Wolfenden,⁵ in 1888, collected together 12 cases, the only ones he found recorded up to that date, which included one of his own.

Chiari⁶ (Vienna), in 1896, collected 4 cases, and described one of his own. His work on Hæmangioma of the Larynx contains the literature up to 1896.

Jurasz⁷ (Vienna), in 1898, collected 19 cases, which included

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A. Brown Kelly

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STATISTICS.

Morell Mackenzie,² in 1871, published 100 consecutive cases of benign growths of the larynx, observed by him between the years 1862 and 1870, amongst which only one example of angioma occurred. The only examples he found recorded amongst 189 cases of laryngeal growths observed by others, between 1860 and 1870, were those of Johnson and Fournié. These two cases, however, were not true angiomata, and are referred to separately in the latter portion of the present article under the heading of *Atypical Cases*.

Fauvel³ (Paris), in 1876, recorded that amongst 300 cases of laryngeal growths which he had collected between 1862 and 1875, he had only observed 2 cases of angioma.

Heinze⁴ (Leipzig), in 1881, refers to having found only 5 cases in the literature, and mentions 2 other cases, one of which he had observed himself, and the other upon which he had operated.

Norris Wolfenden,⁵ in 1888, collected together 12 cases, the only ones he found recorded up to that date, which included one of his own.

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Irwin Moore

three of his own, and he mentions that amongst 192 cases of benign growths of the larynx he had only found 3 cases.

Moritz Schmidt⁸ (Frankfurt) (cited by Jurasz) in his numerous observations on benign growths of the larynx found only one angioma.

Schroetter⁹ (Vienna) (cited by Jurasz) also observed only 1 case.

Lennox Browne,¹ in 1899, stated that he had only seen 3 examples; of these he has recorded one.

Wyatt Wingrave,¹⁰ in 1906, amongst 50 cases of benign laryngeal growths, found only 1 case of pure angioma, 1 case of angio-myxoma, and 9 cases of angio-fibroma.

Phillips and Ruh¹¹ (Cleveland, U.S.A.), in 1913, reviewed the literature of 26 cases recorded up to this date, and added another case of their own, making 27 cases in all.

Emil Mayer¹² (New York), in 1916, brought the number up to 42, which included 13 recorded before 1913 but overlooked by the previous authors, one recorded after publication of their papers, and another reported by himself (Mayer). He states that this is the total number recorded in medical literature.

After a thorough search of the literature, the present writer (Irwin Moore) has traced 31 additional cases of laryngeal angiomata, making a total of 73 as recorded up to July 1920. Amongst these, only two or three appear to be doubtful in character.

CLASSIFICATION.

1. Hæmangioma Simplex (or Local Teleangiectasis).
2. Hæmangioma Cavernosum. 3. Hæmangioma Diffusum (or Teleangiectasis Diffusa).
4. Lymphangioma. 5. Mixed or Atypical cases. These will be more fully described under Histology.

Ætiology.—The ætiology of angiomata of the larynx is obscure. They are considered by some writers to be the result of a previous inflammatory condition of the mucous membrane, which has passed to the chronic stage, with hyperplasia of the tissues; such growths as fibromata and cysts are attributed to the same cause. The fact that in nearly every case there is a history of catarrh of the larynx would appear to support this view. Angiomata are said to occur most frequently in those who abuse their voices, and some authorities consider

Angeiomata of the Larynx

that there is a relationship between nasal obstruction and their development.

Safranek¹³ thinks that angeioma simplex is practically always congenital, and in later life increases in size and gives rise to symptoms, being probably overlooked in early life. He thinks that angeioma cavernosum is due to congenital anomalies of the vascular apparatus of circumscribed regions, even though there are many signs in favour of the fact that it may develop in later life.

Ribbert¹⁴ (Zurich) is also of opinion that they are always congenital, and at a later period may suddenly develop and assume rapid growth.

Brown Kelly¹⁵ and Parkes Weber¹⁶ are of opinion that the teleangiectatic form, *i.e.* angeioma simplex, is not congenital, and generally appears at middle age, but this view is not confirmed.

It is more than probable that the majority of these tumours are congenital in origin, a number of cases having been recorded by careful observers from the age of 9 months upwards. There appears to be very little doubt that lymph-angeiomata are congenital in origin.

Appearance.—Angeiomata may be single or multiple. They are generally unilateral and single, though cases reported by Wolfenden, Hirsch, and T. R. Hamilton were bilateral. They may be associated with similar tumours in other parts of the body.

They vary in size from a lentil-seed upwards, but rarely exceed that of a filbert. They are seldom pedunculated, and generally appear merely as raised plaques.

In character they are generally of soft consistence and analogous to the ordinary *nævi* of the skin, and readily yield to palpation with a probe. Morell Mackenzie has described one of hard consistence.

Whilst *in situ* the hæmangeiomata are of a dark bluish-grey or purplish colour, and of a racemose or blackberry-like character, but after removal they are pale red or pink. In one of Lennox Browne's cases the tumour varied at times from white or pink to florid red.

In the case of the simple form the tumour is generally discovered only accidentally, and appears as a flattened elevation of bright red colour. Horn and Möller¹⁷ refer to this as a varicosed form, which occurs only in isolated cases, such as those of Schroetter, Chiari, and Imhofer.

Irwin Moore

Age and Sex.—They may occur at any age, but most frequently are found during the middle period of life, and in the proportion of four males to one female. Phillips and Ruh, also New and Clark, have recorded the youngest cases in a boy and girl aged 9 months; Goris, in a child aged 4 years; Brady, in a boy aged 6 years, and Edmund Meyer, in a boy 13 years of age. The oldest case has been reported by Bronner, that of a male aged 63.

Site.—These neoplasms may be found in any part of the larynx. In the majority of cases they spring from the margin or upper surface of the true vocal cord, and next in frequency from the ventricular bands and aryepiglottic folds; but instances are recorded in which their origin was from the ventricle of Morgagni, the pyriform fossa, or the epiglottis; hence they may be classified as intra-laryngeal or extra-laryngeal.

Elsberg¹⁸ (New York), in 1884, stated that all those tumours which had been described up to that date were situated near to the anterior commissure, and usually on the right vocal cord.

This opinion is not, however, confirmed by later records, which show that these growths are not necessarily situated near to the anterior commissure, but are much more generally distributed in the larynx, for amongst 66 cases in which the site of the growth was definitely recorded, 33 were situated on the vocal cords (13 on the left, 11 on the right; in 9 cases the affected cord was not stated, and only 11 in the series were close to the anterior commissure).

Of the remaining 33 cases, 4 were on the ventricular bands; 4 originated from the ventricle of Morgagni; 2 were on the epiglottis; 4 on the aryepiglottic folds; 2 in the pyriform fossa; 6 on the arytaenoid or in the inter-arytaenoid region, and 4 were subglottic; 7 were of a diffuse character (in 6 cases partly originating from the vocal cord).

Symptoms.—As long as the tumour remains small there may be no symptoms. When larger, the symptoms to which they give rise are: chronic laryngitis, extending over many years, accompanied by cough, hoarseness, aphonia, difficulty in breathing, or expectoration of mucus tinged with blood. Deglutition may also be interfered with. Hæmorrhage in angiomas of the mucous membrane occurs more readily than in angiomas of the skin, especially if punctured or incised, and is more difficult to arrest in the former case. Serious

Angeiomata of the Larynx

hæmorrhage may occur, as in the cases reported by Loomis and others.

Angeiomata, as previously stated, are seldom pedunculated. A few cases have been recorded by Fauvel,² Elsberg,¹⁸ Kidd,²⁶ Desvernine,²⁷ etc. When pedunculated they are fairly movable, and the symptoms to which they give rise may vary very rapidly, according to whether they hang into the glottis, and therefore prevent closure of the cords, or the reverse. Consequently they may cause respiratory trouble, as in the case of Goris, and even death as a result of obstruction of the larynx, as in the case recorded by Phillips and Ruh.

Diagnosis.—They may generally be recognised by a history of bloody sputum or unaccountable hæmorrhage, which relieves for some time any hoarseness present; by their colour, and by their soft consistency, yielding readily on palpation with a probe. It is said that the remarkable colour of the growths has sufficed in all cases to distinguish them, but this is not so, for a considerable number have only been diagnosed microscopically. Rüeda (Madrid) reports having diagnosed a case of hæmangeioma by aspiration of the tumour with a hypodermic syringe, whilst Richardson (Washington) has diagnosed a lymphangeioma by puncturing it with a laryngeal knife.

The clinical recognition of these tumours is of great importance, in view of the danger of uncontrollable hæmorrhage, which may follow the removal of a portion of the growth for diagnostic purposes. Vascular papillomata, fibromata and varices are frequently erroneously diagnosed and described as angeiomata. Hirsch⁵⁷ remarks that many cases of small bluish nodules on the vocal cords, without external signs of cavernous tumour, and in which no histology has been recorded, should not be regarded as true angeiomata, since they may just as well be varicosed veins, or polypi with great richness in vessels and recurring hæmorrhage. Occasionally angeiomata tend to recurrent hæmorrhages, which may be mistaken for hæmoptysis. Tuberculosis, malignant disease, and cysts of the ventricle of Morgagni, have also been mistaken for this condition. Emil Mayer records a case which was diagnosed as cancer. Shurley reports a syphilitic gumma which was mistaken for an angeioma. Cases of true cavernous angeiomata must be differentiated from lymphangeiomata (see Koschier's and Richardson's cases).

Irwin Moore

HISTOLOGY.

Hæmangioma Simplex.—This variety is constructed of a close plexus of dilated capillaries and small veins, a new formation of capillaries being one of the essential characters of the growth, the lesion being localised to a particular area. The development of new vessels is, certainly at times, traceable at the edge of minute cutaneous angiomas, in the form of lines of proliferating endothelial cells. Although most common in the skin, its occurrence in mucous membranes is widely spread; for it has been met with on almost all mucous membranes. As regards the parts concerned in oto-rhino-laryngology, simple angiomas have been recorded in connection with the mucosa of the mouth, tongue and gums, the hard and soft palate, and the nose; they are, however, very rare in the pharynx and larynx.

Hæmangioma Cavernosum.—In this variety the structure consists of a coarse mesh of voluminous freely intercommunicating blood-spaces, the walls of which are of fibrous tissue lined with endothelium, the whole bearing a general resemblance to the corpus spongiosum. It is the form most commonly met with in the larynx; is not infrequently pedunculated, and presents a granular or moriform surface.

The following is a microscopical description by Hubert M. Turnbull (Pathological Institute, London Hospital) of an extra-laryngeal cavernous angioma (see Plate I., Fig. 1), recently removed by Norman Patterson:—

The tissue is covered by squamous epithelium, which is surmounted by a very narrow stratum lucidum. In the tissue immediately beneath this are small lymph-adenoid nodules and mucous glands.* The remainder of the tissue consists of a net of narrow fibrous trabeculæ separating very wide spaces which are full of blood. The spaces are lined by endothelium. The trabeculæ are formed chiefly of stout collagen fibres. They contain arteries and arterioles, dilated capillaries, a very few veins, a few nerves and, in places, elastic fibres and bundles of involuntary muscle. They show many small areas of infiltration with lymphocytes, plasma cells and occasional eosinophile leucocytes. The muscular fibres in some trabeculæ lie beneath the endothelium and form a circular, usually interrupted, sheath round the blood-space; in other trabeculæ they lie deeper, in

* Only mucous glands are shown in the portion of the section selected for illustration (Fig. 1).

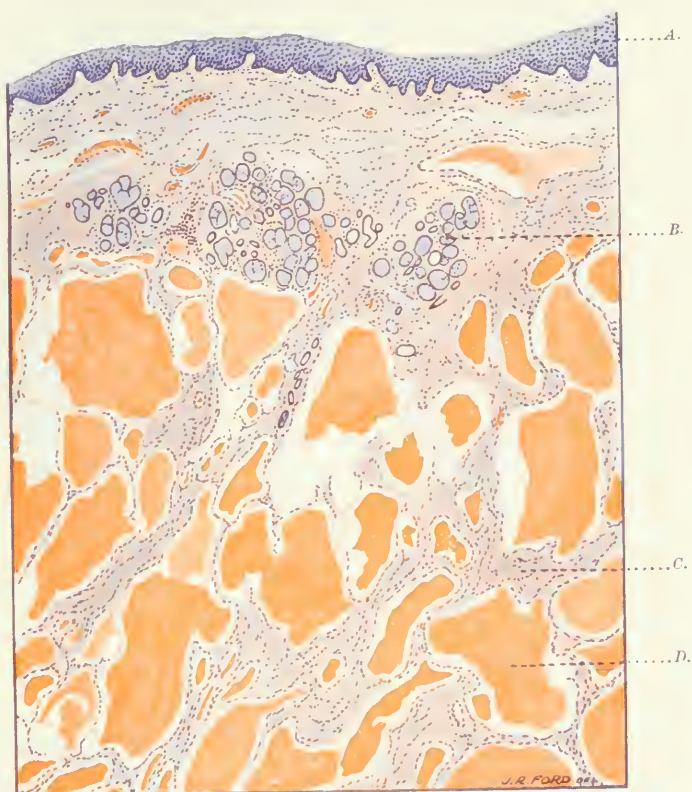


FIG. 1.

Section of Angioma Cavernosum of Left Pyriform Fossa and Aryepiglottic Fold. (Norman Patterson's Case.)

- | | |
|------------------------|------------------------------------|
| A. Surface Epithelium. | C. Fibrous Tissue. |
| B. Mucous Glands. | D. Blood-Clot in Cavernous Spaces. |

*Specially drawn for this Article from a section prepared by
Hubert M. Turnbull—by kind permission.*

Angeiomata of the Larynx

the form of irregularly directed bundles. The elastic fibres are arranged round some of the spaces in a manner closely similar to that in the walls of veins. Superiorly, the blood-spaces reach to within a close distance of the epidermis, and there is no sharp differentiation between the spaces and dilated capillaries in this subepidermal zone, nor between the trabeculæ and the subepidermal fibrous tissue. Inferiorly, the blood-spaces terminate in an even, curved line, the stout collagenous fibres which enclose them being fairly sharply defined from the subjacent, more delicate, areolar tissue. The above characters of the structure of the tissue show that the tumour is clearly not a vascular granuloma, but that it is a true neoplasm—a cavernous angioma composed of atypically walled veins and of capillaries.

Vitto-Massei⁵³ has also given an excellent description along with a coloured microscopical figure of a typical cavernous angioma which he removed.

Hæmangioma Diffusum, or Teleangiectasis Diffusa.—This form has been met with in cases recorded by Loomis, Phillips and Ruh, etc.

Safranek¹³ refers to it as *Angeioma* (or *Aneurysma*), *Arteriale Racemosum*, or *Angeioma Plexiforme*, the condition being due to dilatation and tortuous elongation of the whole of the arteries of some particular region.

Lymphangioma.—The Lymphatics may likewise furnish the source of angiومات: the new growths consisting of dilated lymph channels or spaces which are lined with endothelium and surrounded by a varying amount of connective tissue. Cases have been observed and recorded by Koschier, Richardson, and others.

Mixed or Atypical Cases consist of dilatations in pre-existing normal vessels or form part of the vascular structure of a benign growth, *e.g.* angio-fibroma. These have been observed and recorded by a number of observers, *e.g.* Johnson, Fournié, Hooper, etc.

Prognosis.—Recurrence is very rare in the case of true angiومات.

Morell Mackenzie says there is no evidence of a tendency to recurrence, but Wolfenden refers to a case which had been under the previous care of this writer, where portions of the tissue had been removed on several occasions and had recurred. The growth was finally removed by Bond by thyro-fissure. Koschier refers to a case of lymphangioma, which recurred a few months after removal.

Irwin Moore

ABSTRACTS OF RECORDED CASES OF ANGEIOMATA OF THE LARYNX, in the Chronological Order of their Report.

Morell Mackenzie¹ described, in 1871,* the first case recorded, that of a male, aged 35, who was seen in 1869 with a vascular tumour in the right pyriform fossa (see Plate II., Fig. 2). It was of a hard consistence, the size, colour and form of a blackberry, and was removed by evulsion with forceps in 1870, the base of the growth being later excised with cutting forceps. Slight bleeding only took place. The growth on removal had lost its black colour, and was of a rather bright red hue. Microscopically it appeared to consist of fibrous tissue of an exceedingly close and matted character; no blood-vessels could be observed, nor did it contain any blood, but numerous elongated nuclei were seen. He refers to its appearance as corresponding with the description of a case of a venous vascular tumour removed from the thigh, and referred to by Paget.¹⁹ This case, on account of its position, cannot be strictly classified as a laryngeal growth.

Morell Mackenzie also stated that he had seen a second case in which the growth was situated on the ventricular band, but no details were recorded by him. This case is later referred to by Wolfenden, Bond, and St Clair Thomson.

Lennox Browne,⁹ in referring to these two cases, described the first case as doubtful, and considered that it was an example of *laryngitis varicosa*, as described by Lewin²⁰ (Berlin), especially in view of the fact that it occupied the pyriform fossa, the site especially emphasised by that observer for the exhibition of this lesion.

Fauvel² (Paris), in 1876, recorded a non-pedunculated cavernous angioma of the right vocal cord in a male, aged 53, who had suffered from hoarseness for a year, accompanied by bloody sputum. There was no difficulty in breathing. The tumour, the size of a filbert, varied in colour (in parts) from red to black, and was situated on the right vocal cord, close to the anterior commissure. It was successfully removed by evulsion with forceps, on five separate occasions—only a small amount of hæmorrhage occurring in the form of clots, which were coughed up.

The same author refers to another case in a male, aged 37, where the growth was attached to the free edge of the left vocal cord, near

* In Morell Mackenzie's *Essay on Growths in the Larynx*, 1871, this growth is described under Case LXXXIX. (Appendix A., p. 188), and an excellent drawing (Plate II., Fig. 12) by Lennox Browne is shown.

Wolfenden, in tabulating the case in his article on "Angioma of the Larynx," *Journ. Laryngol. and Rhinolog.*, 1888, II., p. 292, appears to have confused it with Case LXXXIV., Appendix D, p. 234, that of a cystic growth of the left ventricle in a physician, aged 64, seen by Morell Mackenzie in 1864.



FIG. 2.
Angioma of Pyriform Fossa.
(Morell Mackenzie.)



FIG. 3.
Angioma of Right Vocal Cord.
(Solis-Cohen.)



FIG. 4.
Angioma of Left Vocal Cord.
(Percy Kidd.)



FIG. 5.
Angiomas of Vocal Cords.
(Norris Wolfenden.)



FIG. 6.
Angioma of Right Vocal Cord.
(Jurasz.)



FIG. 7.
Diffuse Teleangiectatic Tumour.
(St Clair Thomson.)

Angeiomata of the Larynx

its anterior insertion. It was the size of a pea, bluish red, smooth, and slightly pedunculated. The patient suffered for seven months from severe hoarseness, with sudden attacks of aphonia. This growth was also successfully removed by forceps after four unsuccessful attempts. No bleeding occurred. Both the growths were of a soft consistence. Schwartz²¹ mentions a case recorded by Fauvel, aged 38, in which "two tumours, resembling black currants, were inserted upon the ventricular mucosa near the anterior commissure." This is evidently the second case referred to above.

Coupard²² (Paris), in 1880, reported a case of angeioma of the vocal cord, but his paper is not available.

Heintze³ (Leipzig), in 1880, refers to another case, a male, aged 38, who suffered from chronic pharyngitis and laryngitis, with hoarseness of the voice. A cavernous angeioma, the size of half a lentil-seed, was found springing from the ventricle near the anterior commissure. In addition, and separated by a free space, was a second tumour of one-half the size of the former. They were both reddish black in colour, round and uneven like blackberries, and of soft consistence. Both growths were successfully removed by a galvano-cautery snare, a considerable amount of bleeding occurring during their removal.

Louis Elsberg¹⁸ (New York), in 1884, described three cases :—

1. A cavernous angeioma, reddish brown in colour, smooth and pyriform in shape, the size of a pea, which was attached along the anterior third of the right vocal cord, very near the commissure, in a male, aged 28, who suffered from partial aphonia for four years. The tumour had existed for five years. It was successfully removed with forceps in two sittings, accompanied by severe hæmorrhage, and its base cauterised by nitrate of silver. Cure followed.

2. A similar case in a male, aged 37. The tumour was the same size and shape, pedunculated, and attached by a thin dark pedicle to the right vocal cord near the anterior commissure. The patient had suffered from naso-pharyngeal catarrh for twelve years, and hoarseness for six years. The tumour was removed by the snare, accompanied by hæmorrhage, which was arrested by sulphate of iron. Complete cure followed.

3. A cavernous angeioma of the right pyriform fossa in a woman, aged 52, who suffered from dysphagia, but no alteration of voice. The tumour was successfully ablated (snare or forceps not stated), but severe hæmorrhage followed, which necessitated the application of the galvano-cautery and persulphate of iron to arrest it. There was no recurrence of the growth.

Seiler²³ (Philadelphia), in 1884, recorded a case of true angeioma of the right vocal cord. No particulars are given.

Ferrari²⁴ (Turin), in 1884, recorded another case, in which the

Irwin Moore

growth, the size of a hazel-nut, and of a rosy red colour, was situated beneath the edge of the left vocal cord. It was described as a "teleangiectatic tumour" of the larynx. A small piece was removed with forceps for microscopic examination; this was followed by alarming hæmorrhage, which necessitated tracheotomy and tamponnage. The patient died forty-eight hours later of inspiration pneumonia. Chiari⁵ has described this tumour as a teleangiectatic myxoma, and not a true angioma.

Solis-Cohen²⁵ (Philadelphia), in 1885, mentions that he had seen four cases in his own practice, but he does not describe any of these cases. He remarks that angiomas are met with most frequently at the commissure of the vocal cord, and illustrates a growth of the right vocal cord (see Plate II., Fig. 3).

Schwartz²¹ (Paris), in 1886 (cited by Wolfenden), referred to a submucous capillary angioma of the larynx, but no details are given.

Percy Kidd,²⁶ in 1888, described the case of a woman, aged 50, who complained of aphonia for eight or nine years and chronic bronchitis. The tumour, which was rounded, and the size of a pea, imperfectly bilobed, dark red, and finely granular like a ripe raspberry, originated from the upper surface of the left vocal cord, at the junction of the anterior and middle thirds, by a broad, flat pedicle, which allowed of considerable movement (see Plate II., Fig. 4). It was removed by means of Mackenzie's forceps in two pieces, and microscopically was shown to be a true angioma. No bleeding of any consequence occurred.

A coloured microscopical section of this growth is illustrated in *Studies in Pathological Anatomy* by Wolfenden and Sydney Martin. (Plate VI., Fig. 1.)

Desvernine²⁷ (Cuba), in 1888, recorded a pedunculated encapsulated angioma of the epiglottis in a man, aged 53. There was a history of occasional bleeding from the throat, the cause of which, for some time, was obscure, and on one occasion severe hæmoptysis occurred. The tumour was ovoid, lobulated, of a violet colour, measured 2 cm. by 1 cm. and was attached by a pedicle to the laryngeal surface of the epiglottis. It was removed by the galvano-cautery.

Wolfenden,⁴ in 1888, gave particulars of a case in a male, aged 44, who complained of slight hoarseness and recurring attacks of laryngitis, with occasional expectoration of blood. A large bright red raspberry tumour was seen upon the surface and edge of the right ventricular band, along with a similar but smaller growth on the anterior extremity of the left vocal cord, which had been present for twenty years (see Plate II., Fig. 5). This case had previously been under the care of Morell Mackenzie and other medical men, and on several occasions portions of the growth had been removed by forceps

Angeiomata of the Larynx

and the galvano-cautery, but had recurred. [This is the case referred to by Bond in 1899, in which he performed thyro-fissure.] In reporting this case, Wolfenden also tabulated 12 out of the 15 cases (which include the above case) recorded up to this date. He does not include amongst the true angeiomata the case reported by George Johnson,⁷² and referred to by Morell Mackenzie, which was a vascular cyst, or the one recorded by Hooper⁷⁶ (Boston), which was a vascular papilloma, similar to one previously seen by Ariza⁷⁷ (Madrid), in 1887, since neither of these were considered to be true angeiomata.

Glasgow²⁸ (St Louis), in 1889, refers to the case of a male, aged 30, who suffered from persistent hoarseness for six months, and a short cough. A greyish-brown lobulated mass, the size of a large pea, was seen attached to the anterior part of the left vocal cord, a portion of the growth reaching the anterior commissure, and another portion being attached by a pedicle to the surface and edge of the left vocal cord. It was very soft, and was removed *en masse* with forceps under cocaine anæsthesia, only very slight hæmorrhage occurring—scarcely a small teaspoon. No recurrence.

Brown²⁹ (cited by Phillips and Ruh), in 1889, recorded, in a male, aged 26, an oval-shaped vascular tumour on the left ventricular band, occupying almost its entire upper surface. It was of a uniform grey colour. The patient was not treated. The original reference could not be traced for further particulars.

Tauber³⁰ (Denver, U.S.A.), in 1889, recorded the case of a male, aged 42, who had an impediment to deglutition and a defect in speech, with shortness of breath. He had been treated for two years for catarrh. A smooth, shiny, bluish-red growth covered the entire dorsal surface of the epiglottis. The interior of the larynx was not implicated to a great extent—only a chronic laryngitis. The tumour was removed by the galvano-cautery loop, with very slight hæmorrhage. It measured $1\frac{1}{4}$ inches in length, and 1 inch in width. All symptoms disappeared, and there had been no recurrence eight years after. Microscopically, the growth proved to be an angeioma.

Loomis³¹ (New York), in 1890, reported the case of a woman, aged 62, who had a tumour as large as a walnut projecting from the left side of the tongue; another involving the left side of the pharynx, both continuous with a third mass in the neck, extending from the superior maxillary bone to the clavicle. The tumours were of a purple colour, soft, and the growth in the pharynx could be enormously increased in size by compression of the mass in the neck. The tumours were stated to have existed since birth. Later, the tumours of the tongue and pharynx increased to the size of a lemon, and the cervical tumour extended from the level of the orbit to the clavicle. The patient died from congestion of the lungs and dropsy.

Irwin Moore

Post-mortem examination of the larynx showed two angiomas, one the size of a large pea, projecting from the ventricle of the larynx, and the other the size of a cherry, at the lowest part of the aryteno-epiglottidean fold.

This is an example of a diffuse angioma or teleangiectasis.

Jurasz⁶ (Heidelberg), in 1891, recorded three cases.

1. A male (age not stated), with a bluish-red tumour, situated anteriorly on the left vocal cord, larger than a millet-seed, and with an uneven surface. It was destroyed by the galvano-cautery on two occasions, followed by severe hæmorrhage.

2. A male (age not stated), with a red nodule half the size of a millet-seed, situated on the anterior portion of the right vocal cord. It was destroyed by the galvano-cautery, followed by only slight hæmorrhage.

3. A female (age not stated), with a small red nodular mass, situated on the centre of the right vocal cord (see Plate II., Fig. 6). The galvano-cautery was applied, with only slight hæmorrhage.

There was complete cure in all three cases.

These cases were supposed to be congenital. (Chiari.)

Schrötter⁸ (Vienna), in 1892, discussed the question of varicose veins and angiomas in the larynx. In many cases, he says, of local circulatory disturbance he found varicose veins on the epiglottis and aryepiglottic folds. He records a small angiomatous nodule on one vocal cord (which side is not stated), an accumulation of small varicose veins, from which frequent hæmorrhage occurred. He assumed from this case that in all probability most of the laryngeal tumours described as angiomas are really fibromata or papillomata, very rich in vessels. He removed, on another occasion, a varicose vein the size of a pea from the left aryepiglottic fold.

Dundas Grant,³² in 1893, recorded a case of submucous hæmorrhage from the vocal cord in a woman, aged 24. There was a history of frequently repeated hæmorrhages during four years. Latterly, a small red tumour developed on the left vocal cord. It was removed by forceps without much hæmorrhage.

Chiari remarks it is doubtful whether this was an angioma or not.

Ramon de la Sota³³ (Seville), in 1895, reported a case of mucous polypus of the left vocal cord, which was considered to be an angioma, but no particulars are available.

Rueda³⁴ (Madrid), in 1896, at the First Spanish Congress of Otology, Rhinology, and Laryngology, reported the case of a woman aged 56, who had an angiomatous tumour of considerable size, which occupied the right aryepiglottic fold and arytenoid. The growth was movable and of a bluish-red colour, and was diagnosed by aspiration

Angeiomata of the Larynx

of blood with a syringe. The question of removal is not referred to in the report.

Bean⁸⁵ (U.S.A.), in 1896, reported two cases of angeioma of the larynx. (1) A pedunculated tumour, situated at the middle of the upper surface of the right vocal cord. (2) A similar tumour on the free margin of the right vocal cord. The exact position is not stated.

Both were extirpated with forceps; no hæmorrhage is recorded, and there was no recurrence.

Chiari⁵ (Vienna), in 1896, referred to a male, aged 28, who suffered from chronic pharyngitis and laryngitis. A round, bluish, sessile nodule, the size of a large hemp-seed, was seen in the middle of the right vocal cord. It was removed by forceps on two occasions, with "disproportionately great hæmorrhage."

Pantaloni⁸⁶ (Italy), in 1897, recorded an angeioma of the left vocal cord in a woman, aged 38. It was removed by thyro-fissure. No further details available.

Kuttner⁸⁷ (Tübingen), in 1897, wrote a paper (cited by Harmer) on "Intermittent Inflammation of Lymphangeiomata."

Ribbert¹⁴ (Zurich), in 1898, published a paper giving original views and a consideration of the genesis of hæmangeiomata and lymphangeiomata under one heading.

Bond,⁸⁸ in 1899, described the case previously reported by Wolfenden in 1888, and referred to the growth as a dark-bluish tumour, situated upon and covering two-thirds of the right ventricular band. Later, he performed thyro-fissure and removed the tumour. (See also reference to this case by St Clair Thomson in 1905.)

Lennox Browne,⁹ in 1899, refers to a case which he had operated upon in 1891, a male, aged 40, who had suffered from hoarseness for two and a half years. The growth, which was small, round, smooth, and of a pink colour, was situated at the anterior commissure, had the appearance of a papilloma, and was removed by a snare. It was described as a thrombosed angeioma. Two microscopical sections of the tumour are illustrated.

Hamilton⁸⁹ (Sydney), in 1899, recorded an angeioma of the vocal cord, in a female, aged 25. There were two growths: the larger one originated from the right cord, at the junction of its anterior and middle third, and partly from its free border and upper surface, thus interfering with complete adduction. The second growth, which was on the opposite cord, was much smaller, somewhat more posterior, and entirely on the upper surface.

The larger growth was entirely destroyed with the galvano-cautery. The smaller one was treated by the application of 20 per cent. solution of sulpho-ricinate of phenol, applied at intervals of three days. After the third application not a trace of the growth was

Irwin Moore

to be seen. Hamilton thinks that the larger growth could have been removed in the same way.

Goris⁴⁰ (Brussels), in 1899, reported the case of a child, aged 4 years, with symptoms of hoarseness for two months, accompanied by attacks of dyspnoea. A round bluish tumour was seen almost covering the laryngeal aperture. The right vocal cord could be seen here and there intact.

Tracheotomy and thyro-fissure were performed, and the tumour removed by a snare. A fair amount of hæmorrhage occurred, which was controlled by the galvano-cautery. The tumour was found to be the size of a lentil, occupying the left ventricle of Morgagni, the wall of which it had displaced upwards, which wall had appeared laryngoscopically to be a tumour. The true tumour was proved to be a vascular angioma.

The child died nine months later of typhus.

Seifert⁴¹ (Wurzburg), in 1900, saw one case in a man, aged 50, suffering from repeated hæmorrhages. The tumour was found to originate from the left vocal cord. No further particulars are obtainable.

Sampson Trask,⁴² in 1900, described a tumour with a smooth, lobulated upper surface, attached by a broad base in the inter-arytenoid region, in a male aged 28. On deep inspiration the tumour projected into the lumen of the larynx. The voice was not affected. No other details given.

Fränkel⁴³ (Berlin), reports two cases, but details are not available.

Shurley⁴⁴ (Detroit), in 1900, reported a case in a syphilitic subject, which was diagnosed as a gumma. The growth almost entirely encircled the lower laryngeal and upper tracheal region. During a tracheotomy the growth was unfortunately incised, and caused uncontrollable hæmorrhage, which resulted in the death of the patient.

Shurley also refers to a case of W. C. Gibson of St Louis, which is evidently an error for the case of W. C. Glasgow of St Louis, previously referred to.

Brady⁴⁵ (Sydney), in 1901, recorded a case in a boy aged 6 years, who suffered from hoarseness, dyspnoea, and expectoration of blood. The tumour bled easily, and was removed under chloroform with endo-laryngeal forceps. It was the size of a cherry, deep red, and was situated below the anterior commissure of the vocal cords.

Bronner⁴⁶ (Bradford), in 1902, exhibited a specimen of a pedunculated angioma of the larynx at a meeting of the Laryngological Society of London. The patient, aged 63, had been slightly hoarse for twenty years, during the last five years of which the hoarseness had increased. There was no dyspnoea. A large raspberry-

Angeiomata of the Larynx

shaped growth was seen in the glottis, almost the size of a marble, only a small part of the vocal cord being seen. It probably sprung from the anterior part of the left vocal cord and was removed by forceps. Microscopically it was found to be a nævoid growth of the mucous membrane ulcerated in the centre, and had become consolidated with fibrin and exudation. The vascular channels in the deeper tissues were large and numerous.

Edmund Meyer⁴⁷ (Berlin), in 1904, reported a subglottic angeioma in a boy aged 13 years. It was situated on the right vocal process, and filled the larynx sufficiently to cause great dyspnœa. It was removed by laryngo-fissure and the galvano-cautery snare, and was composed of cavernous tissue and newly-formed vessels.

Biazzì⁴⁸ (Mailand, Italy), in 1905, recorded, at the Eighth Congress of the Italian Association of Laryngologists, a cavernous angeioma in a hæmophilic, aged 42, who suffered from hoarseness of two years' duration, and occasional dyspnœa. The growth was the size and colour of a blackberry, and was spontaneously expectorated with much hæmorrhage. A second and larger growth was removed by forceps eight days later, followed by severe hæmorrhage. The hæmorrhage on each occasion was controlled by gelatin enemata.

Imhofer⁴⁹ (Prague), in 1905, reported a case which, although cited by Horn and Möller as a hæmangeioma, is recorded by Imhofer as "a hæmatoma of the vocal cord and phlebectasis."

Charters Symonds,⁵⁰ in 1905, exhibited a case at a meeting of the Laryngological Society of London (7th April). The patient, a male aged 30, suffered from recurring colds and hoarseness. The growth, which was vascular, lobulated, and purple in colour, was situated on the right side of the larynx, overhanging, but not involving, the right vocal cord. The ventricular band was lost in the swelling, the anterior edge of the vocal cord being just visible on phonation. It was diagnosed as an angeioma, which had probably existed since birth, and recently been aggravated by catarrh.

St Clair Thomson,⁵¹ in a discussion on this case, referred to a patient, aged 25, whom he had first seen in 1900, and who had frequented the Golden Square Hospital for twenty or thirty years, suffering from a bluish infiltration of the right ventricular band. He mentioned that this case had in the past been seen first by Morell Mackenzie, and later by Wolfenden and Bond, and that attempts had been made on many occasions to treat the case by the galvano-cautery, resulting in hæmorrhage, which only occurred at these times. Later, at a meeting of the Laryngological Society, he showed a coloured drawing of the larynx (drawn in 1900), and described the case as a marked example of angeioma of the larynx—not a local tumour, but as seen from the drawing a form of teleangiectasis

Irwin Moore

beneath the mucous membrane, involving the right vallecule, the right aryepiglottic fold, both ventricular bands, and the left subglottic region (see Plate II., Fig. 7). He gave the patient's age as 30 (but if correctly reported by Bond and Wolfenden the patient's age at this time would be 57). He believed that the patient had not suffered from hæmorrhage (but, as recorded by Bond, repeated spontaneous hæmorrhages had occurred apart from the time that the galvano-cautery was used). He was apparently not aware of the later history of the case, and that Bond had performed a thyro-fissure in 1899.

Morell Mackenzie¹ mentioned this case in 1871, but without giving any details. He referred to the tumour as "an angiomatic growth situated on the ventricular band."

Wolfenden⁴ also published the same case in 1888, and gave the patient's age as 44. He described the growth as a large red raspberry tumour on the surface and edge of the right ventricular band, along with a smaller growth on the anterior extremity of the left vocal cord. It had been present for twenty years, and there was a history of occasional expectoration of blood. A drawing of the larynx from this author's publication shows the appearance of the growth at that date (see Plate II., Fig. 5).

Bond³⁸ exhibited this case at a meeting of the Laryngological Society on 4th November 1898, and the following description is recorded:—

The patient was aged 53, and had suffered from hoarseness for twenty-eight years. As a boy he had been accustomed to shout tremendously. He had attended Golden Square Hospital for many years under Morell Mackenzie, and had been treated with the galvano-cautery. At varying intervals he had spat up blood, and when seen by exhibitor he was coughing up blood and phlegm freely.

In 1899, as previously stated, Bond removed the growth by thyro-fissure, and described it as a dark-bluish tumour, situated upon and covering two-thirds of the right ventricular band. No further details were published.

A comparison of the drawing of this angioma by Norris Wolfenden (see Plate II., Fig. 5), with its increase and extension as shown by another drawing by St Clair Thomson in 1900 (see Plate II., Fig. 7), is interesting. We have, in this case, the complete history for twenty-eight years of an angioma of the larynx from its apparent origin in 1871 to its removal in 1899 by thyro-fissure.

This case has been referred to by many writers, without any details, as a separate case recorded by St Clair Thomson, whilst it has also been recorded under the names of Morell Mackenzie, Wolfenden, and Bond as three different and separate cases.

(To be continued.)

CLINICAL RECORD

INFECTION OF THE MIDDLE EAR AND EXTERNAL AUDITORY MEATUS, WITH VINCENT'S ORGANISMS.

By WYATT WINGRAVE, M.D., and ARCHER RYLAND, F.R.C.S.Ed.

THE patient, a girl aged 19, came to the Central London Ear and Throat Hospital, complaining of discharge and pain in connection with the right ear. The discharge had been present for about one year, and the pain (referred to the floor and anterior wall of the external meatus) had been complained of for about one month.

According to her statement, there was no history of any mouth or throat disease previous to the appearance of the middle ear sepsis. Nor, on examination, was there any evidence that there had been an ulcerative lesion of the tonsils, pharynx, or fauces, nor was any ulcer observed in the mouth or throat. There was no glandular enlargement.

On examination of the right ear, a chronic suppurative middle ear condition was found to be present, associated with a large posterior perforation, and a thin offensive purulent discharge. On the outer part of the floor and the anterior wall of the external meatus, there was a moist, macerated, septic area, in fact a superficial ulceration which had not involved the whole thickness of the skin, and which was about one square centimetre in size.

The appearance was unusual. No false membrane was present. A sterile swab applied to the infected surface was sent to the pathologist for examination. Films showed the *Spirochæta fœtida* and the *Bacillus fusiformis* in abundance, and very few other organisms were present. It was therefore typical "Vincent," but in view of the fact that these organisms are very common in chronic fœtid ear discharges, a diagnosis of primary Vincent's Angina of the external meatus was withheld.

On further examination, a week later, swabs were carefully taken from the tympanic chamber and revealed pure Vincent's organisms in all stages of growth, from the short to the long fusiform, the filament, and finally the spirochæte. They were growing in conditions peculiarly favourable, namely, a putrefactive medium in a badly drained and ventilated chamber.

The case, therefore, was simply one of chronic suppuration of the middle ear, in which Vincent's organisms were the only variety found, as careful search did not reveal any pyogenic cocci, and further, the discharge was not true pus. In the external meatus there was the eczematous condition, but no granulation tissue.

Wyatt Wingrave and Archer Ryland

In the cases recently reported by Mr Cheate (*Journ. of Laryngol.*, 1920) there were granulations in the meatus as well as middle ear discharge. He suggests that the meatal condition was probably an infection from the gums, conveyed by the fingers. This view is difficult to accept, as we know how refractory is the cultural habit of the organism. It will not grow on ordinary media nor under purely aerobic conditions. The best results have been obtained from excised tonsils incubated anaerobically. There could not be a more unfavourable soil for inoculation than an intact meatus covered with dry epithelium.

As the healing of the meatus in these cases revealed perforation of the tympanic membrane and middle ear discharge, it is not unlikely that the tympanic trouble preceded the meatal and was the real source of the Vincent's organisms, though unrecognised as such at first.

Should the term Vincent's Angina be applied to these cases? The question is still unsettled as to whether these organisms are causal or consequential.

REFERENCES.—"Spirochætes and other Throat Organisms in Discharge from the Middle Ear," *Journ. of Laryngol.*, Aug. 1907. "Vincent's Angina," *Brit. Med. Journ.*, 1909. "Spirochætal Ulceration of Tonsils," *The Lancet*, 1915.

CRITICAL REVIEW

DEAF MUTISM.

By J. KERR LOVE, M.D.

DEAF Dumbness or Deaf Mutism is one of the oldest accurate diagnoses. Pliny the Elder (died 79 A.D.) tells us "neither are any born deaf who are not also dumb." Alexander of Aphrodisias (a city of Caria in Asia Minor), a medical writer of the early part of the third century, definitely states that the absence of hearing in the deaf mute is the cause of the dumbness. In spite of this early and accurate diagnosis, medical men left the deaf mute severely alone for nearly 1800 years. In the meantime, the deaf mute was not quite neglected. He was taught to use a language of signs, to spell on his fingers, to write and even to speak so successfully that the speech enthusiasts among the teachers want us to give up the term deaf mute and to substitute the term "the deaf." But the term deaf mute remains in use because it describes *that amount of deafness which, occurring in childhood, involves dumbness.* The writer, a quarter of a century ago, applied the term "surdism" to this degree of deafness. The term has not found favour. It has a real use for those who wish to assign a cause without including its effect, but it will not displace the older and more inclusive term "deaf mutism."

Itard,¹ Physician to the Royal Deaf and Dumb Institution in Paris (1821), wrote on Deaf Mutism. He dealt both with the pathology and treatment. For the most part he found the ears of deaf mutes normal. In a few cases he describes changes in the middle ear, and in one a change in the auditory nerve. His treatment was crude, *e.g.* application of hot irons to the mastoid process, which seem to have been used in cases of middle-ear deafness: but treatment in those days was crude, and in the absence of a well defined pathology could not be successful. It is with a distinct feeling of relief that we turn to Dr W. Kramer² of Berlin who, in 1853, told us some very wholesome truths about the deaf and dumb. He states that "hitherto no single deaf mute has been cured, that is to say, has been rendered capable of communicating like a person who hears well with his fellow-men in an unrestrained manner by hearing under all circumstances." Could his century-old statement be clearly put before the too hopeful parents of deaf mute children, what an amount of hope and fear would subside, and how the quack would wilt! In any case let the doctors read it and remember that the exceptions to it are so few that in our prognosis we had better forget them. But this careful and honest observer makes a curious

J. Kerr Love

statement; whilst assigning "original defects of conformation" as pre-eminently the cause of deaf mutism, he says, "In the strict sense of the term this cannot be called hereditary predisposition, for as yet no instance is known of deaf and dumb parents having produced deaf and dumb children." This was twenty-five years before Mendel wrote and sixty-five years before Mendel's work was known. Even the statisticians had not begun to speak.

The work of E. Schmalz,⁵ in 1838, dealing with German statistics, and that of Wilde³ embodying the Irish statistics (census of 1851), although far from accurate, begin to define the relative sizes of the groups of acquired and congenital deaf mutism. In no department of work are statistics more unsatisfactory; but the figures from census and from individual schools—for in the meantime these had begun to grow up both in Europe and America—soon established several facts:—

1. That about half the deaf and dumb were born deaf.
2. That of the other half most became deaf from some infectious disease, scarlet fever, measles, or meningitis.
3. That congenital deafness was far commoner amongst the children of the deaf born than amongst the children of the hearing.

The work of Dr William R. Wilde has been mentioned before. He was a Dublin surgeon who practised aural surgery, or aural medicine as our art was more correctly described, in the middle of the nineteenth century. His handling of the Irish statistics of the census of 1851 gives an exaggerated idea of the ratio of congenital to acquired deaf mutism, but he brings out strongly the influence of heredity and of consanguinity in the production of congenital deafness. True, he gave great weight to fright during the pregnancy of the mother as a cause of deafness in the child, but of course he was dealing with reports sent to him, and not with personal observation. Wilde does not seem to have examined the ears of deaf mute children on any considerable scale. He relegates his long article on "Deaf Mutism" to an appendix to his work on Aural Surgery.

In 1860, Joseph Toynbee⁴ of London, in a chapter extending to little over twenty pages, discussed the deaf mute. Toynbee got the length of examining the ears of these children. Few of his predecessors got as far. He also gave a tabular view of the condition of the ears in thirty-six dissections of deaf mutes. We know now that nine out of ten deaf mutes are so because of disease or congenital defect in the cochlea or the auditory nerve, and that the middle and external ears are normal in the congenital cases. What was found in the middle ear was the result of scarlet fever, measles, etc., and was not characteristic of deaf mutism. The semicircular canals were sometimes wanting, the auditory nerves as "soft as mucus" or "harder than usual." The

Deaf Mutism

cochlea was never mentioned. How could it be? Corti only described the cochlea in 1851.

The most valuable statistics came from the schools. For long, these schools were residential institutions. There were few day schools even for those possessed of hearing. There was no compulsory education. The institution for the deaf mute was inevitable. He was an outcast; nobody understood him. Saints like De L'Epée gathered deaf children round them and not only taught them but fed and clothed them. Then committees took up the work of individuals and institutions were built. At first the latter were called asylums, and the term stamps the public attitude towards the deaf mute child. Now that the teachers had the deaf mutes they could study them. That was more than the doctors had done, and therefore the best statistics came from the schools or institutions.

Up till 1880 medical writing on "Deaf Mutism" was generally relegated to the last chapter of a book on diseases of the ear. In that year Arthur Hartmann⁶ of Berlin wrote his work on *Deaf Mutism*, giving the deaf and dumb a whole book to themselves. The book was translated into English by Dr Cassells—the first aural surgeon to the Glasgow Royal Infirmary, a predecessor of the present writer. Hartmann knew the deaf mute child well, especially the living child. Mygind,⁷ who wrote fourteen years later (1894), had no experience of living deaf mute children, but he devoted much space to the morbid anatomy of deaf mutism, and the latter is the most valuable part of his work. Both writers cover the whole medical field—Diagnosis, Statistics, Etiology, Morbid Anatomy, and Treatment. But there is one significant difference. Hartmann devotes nearly half of his book to the education of the deaf, whereas Mygind dismisses the subject of the selection of methods with the remark, "The solution of this problem must be left to pedagogues." However, he finishes his work with a well worded urgent appeal: "To submit all children who suffer from deafness, which threatens to cause or has caused deaf mutism, to a rational examination of the ears and of the adjacent mucous membranes, and eventually to make the existing diseases the subject of a rational treatment." Even this appeal is not enough. *It is the infectious diseases which cause the deafness which must be treated or prevented if the child is not to become deaf mute.* (See Special Report on the Prevention of Deafness sent by Scottish Society of Laryngology and Otology to the Scottish Board of Health.)

Bezold of Munich examined the hearing of deaf mutes by the continuous tone series, and established the somewhat remarkable fact that nearly all deaf born children have some hearing, the latter in islands at one or more parts of the musical scale. He found many cases of acquired deaf mutism with no hearing whatever—a result

J. Kerr Love

which does not surprise us, as, for instance, in meningitis, where perhaps the auditory nerve has been involved in its entire thickness. We have no large number of post-mortem examinations of the ears of hereditarily deaf children, but Bezold's observations point to defect in the cochlea. Helmholtz died before Bezold made his discovery of hearing islands in the ears of deaf mute children. With some justice he might have claimed Bezold's cases as corroborative of his "piano" theory of hearing, the theory of sympathetic vibration.

When the writer⁸ began his work amongst deaf mute children in 1890, he found the field in Britain practically unoccupied except by the teacher and the missionary. The deaf mute child was an object of pity to the general public and a "subject" to the pathologist. I have tried to raise him to the rank of a patient, and to point the way to his ultimate disappearance. This line of enquiry raises two questions: (1) the classification of deaf mutes for educational purposes, and (2) the prevention of deafness. And first a word about the morbid anatomy of deaf mutism. Exact work here is intrinsically difficult because of the position and delicacy of the object to be examined—the cochlea. But worse than that—deaf mutes do not die of deafness, and if they are spared by the disease which takes away their hearing and makes them dumb they are spared a very long time; so when they die they are seldom attended by specialists who want to examine the internal ear. *A series of post-mortem examinations on undoubtedly deaf born children is the thing most wanted from the pathologist at present.*

Returning now to the classification of the deaf and its bearing on educational progress, we have seen, on the one hand, that most deaf born children have some hearing, and that many deaf mutes who have lost their hearing from disease are quite deaf. Yes, but the loss has often taken place after speech has been acquired and the speech in these so-called "semi-mute" children may be preserved and greatly extended by oral training. Then there are a good many deaf children who hear and distinguish vowels and a few who hear and distinguish consonants, and these exist amongst both the congenital and acquired classes. This residual hearing is of great value in the development of speech. *These semi-deaf children and the semi-mute above referred to should certainly be trained by the oral method. Both of these classes if properly taught will continue to use speech as the ordinary means of conversing with their fellow-men in after life.* For the rest, comprising most of the congenitally deaf, the latter statement is not true; speech may and I think should be taught, but the above result will not follow except in a few cases. I have written recently so fully in this Journal on the prevention of congenital deafness (see number for Sept. 1920) that I need only repeat that, where this condition is truly hereditary, it

Deaf Mutism

is probably Mendelian in incidence and often preventible by ordinary foresight on the part of those about to marry. In this connection a study of Dr Fay's work on *Marriages of the Deaf in America* is valuable. The prevention of acquired deaf mutism will not be attained by the study of the condition in the ear or within the brain causing the deafness. These are residual pathological products due to a process long extinct. *The original disease is almost always an infectious one, and it is to the prevention of this latter that we must look if we want to get rid of our acquired deaf mutism.*

Special mention should be made of syphilis. For a long time it has been recognised that this disease causes profound deafness in those who acquire it, and that their children often become deaf or blind, or both, during the early years of school life. The writer has shown that *this disease is a cause of congenital deafness* and has given several family trees demonstrating the fact. But this form of congenital deafness is probably not hereditary. The notification of such cases and the treatment of the entire family is urgently called for.

A few medical men have taught the deaf or have made valuable contributions to the literature of teaching. Such were Dr John Bulwer, an English physician, who wrote, in 1648, *Chironomia*, or the natural language of the hand, and *Philocophus*, a book on lip-reading; and Dr Amman, a Swiss physician who, however, practised in Amsterdam, and who wrote *Surdus Loquens*, the speaking deaf. In spite of these and earlier efforts by non-medical teachers we find about the middle of the eighteenth century the adjectives "German" and "French" applied to the oral and sign methods respectively. If the oral method is national at all it is Spanish; the sign method is as old as the first deaf mute child. Heinicke the German preached oralism, De L'Epée preached and elaborated signs; neither invented the means used. But the rôle of the medical man is not that of a teacher of the deaf. His is to study not only the ears, the hearing, the voice and the speech, but the whole deaf child, to apply this clinical knowledge in the interests of the deaf, and, above all, to seek for the causes of deafness and by their removal to make these special methods merely interesting recollections.

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SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY

January 17, 1919.

President—DR HUGH E. JONES.

Deafness Associated with the Stigmata of Degeneration.

THE PRESIDENT.—I suggest that there is a form of deafness due to inborn degeneration of one or more sets of the neurons which connect the ganglion spinale with the brain cortex, and that this degeneration is associated with degeneration of other more or less remote epithelial tracts. An example of the latter is seen in defects of the auricle. Amongst the general public, such defects are observed in 20 per cent. of individuals. In the Out-patient Department of an Ear Hospital, 64 per cent. of the patients showed auricular defects such as are associated with degeneracy. In cases of chronic tympanic catarrh and otosclerosis, the percentage of defective auricles was as high as 84. In a case with loss of bone conduction, I observed a cleft helix, an attached lobule and Darwin's tubercle. I believe that degeneration is the underlying condition and predisposing cause of many diseases both of the middle and internal ear; it makes the auditory organ more vulnerable and less amenable to treatment.

While the insane and the criminal have more deaf individuals among them than has the ordinary population, I do not imply that all or even many individuals exhibiting minor defects of the auricle have criminal tendencies or defective mental powers. My suggestion is that such defects are associated mainly with localised *actual* or *potential* degeneration of the auditory nerve tract. The aim of treatment should be to influence the nutrition of the child from its conception, and its nutrition and environment from its birth. It takes into its scope not only the child, but the health and habits of the parent.

Mr W. Stuart-Low, Dr H. J. Banks-Davis, Mr T. Guthrie, Dr Kelson, Dr Somerville Hastings, and Dr W. M. Mollison took part in the discussion.

Royal Society of Medicine

February 21, 1919.

The Radical and Modified Radical Mastoid Operations: Their Indications, Technique, and Results.—J. S. FRASER and W. T. GARRETSON.

This paper appeared in full in the *Journal of Laryngology, Rhinology, and Otology*, Vol. xxxiv., October, November, and December 1919.

DISCUSSION.

Mr ARTHUR CHEATLE commented upon the large number of cases of chronic middle-ear suppuration seen in school children and on the number of men rejected for the Royal Air Force on account of the same disability. He regarded the modified radical operation as bad and unscientific in acute and subacute cases, and as inefficient in chronic middle-ear suppuration.

Dr KERR LOVE considered that there was a tendency to operate on too many cases of chronic ear discharge. He found that the condition in many school children yielded to conservative treatment, and when he operated he found the modified radical suitable.

Mr CHARLES J. HEATH said that when the aural discharge following the exanthemata did not cease after a few months of treatment, the conservative operation was performed by him. He could not agree with Mr Cheatle that this form of operation was undesirable in acute cases.

Dr WILLIAM HILL thought that the communication between the external meatus and the antrum, which the Heath operation produced, was disadvantageous.

Mr W. STUART-LOW divided his ear cases into two groups—those curable by the Schwartze operation, and those that were not. On the latter he performed the complete operation.

Dr DUNDAS GRANT commented upon the undesirableness of removing the posterior meatal wall as practised by Heath; he had had to convert the conservative operation into the radical in a number of cases which he had seen.

Mr SOMERVILLE HASTINGS preferred the modified radical to the Schwartze operation.

Sir CHARLES BALLANCE said that the surgeon should adapt his operation to the case according to what he found.

Mr J. S. FRASER, in reply, pointed out that one great objection which he had to performing the modified radical operation in acute cases was based on the fact that the tip of the mastoid process lay

Societies' Proceedings

below the level of the external meatus and consequently efficient drainage into the meatus was not possible. In cases of chronic suppuration in which the hearing in the ear to be operated upon is less than "conversation voice at four feet," it is not worth while performing the modified radical operation, granted that the other ear is normal. On the other hand, if the hearing in the "non-operation" ear is bad, then it is worth while doing the modified operation on the affected ear. Until Mr Heath published his results we could not get much further forward in the controversy. He could not agree with Mr Heath's pathology, as he had not found that the antrum was the source of the discharge in every case of chronic otorrhœa.

Septic Infection of the Lateral Sinus accidentally injured during the Operation of Mastoidectomy.—Mr HUNTER TOD.

Theoretically, accidental injuries of the sinus should not occur. Nevertheless the majority of those who have performed a large number of mastoid operations have injured the sinus wall on more than one occasion. Fortunately subsequent septic infection rarely takes place. Injuries may be divided into two groups: (1) A clean cut through the wall of the sinus with profuse hæmorrhage, necessitating obliteration of the lumen in order to arrest bleeding. In these cases I have never observed subsequent infection of the sinus. (2) Grazing of the outer layer or puncturing of the sinus wall.

Conclusions.—(1) Whenever the lateral sinus is exposed during the mastoid operation, careful inspection should be made to see if it has been injured.

(2) If the sinus wall has been injured, the wisest procedure is to expose it freely and obliterate its lumen completely by means of gauze packing, well beyond the affected area.

(3) There may be no evidence of infection until about the tenth day after the mastoid operation, when a sudden rigor may be the first symptom. As a rule, for one or two days previous to this there is pyrexia with increased pulse-rate.

(4) If hæmorrhage occurs from the mastoid wound a few days after the operation, the bone should be removed from the sinus wall above and below the affected area, and gauze plugging inserted, the sinus slit up and explored. Further surgical treatment depends on what is found.

(5) The internal jugular vein should always be ligated in cases of septic infection of the sinus in which hæmorrhage has occurred.

The following members took part in the discussion:—The President, Dr Dan M'Kenzie, Dr H. J. Banks-Davis, Mr Stuart-Low, Mr W. M. Mollison, Mr Charles Heath.

Royal Society of Medicine

SECTION OF LARYNGOLOGY

February 7, 1919.

President—DR JAMES DONELAN.

Cases of Malignant Disease of the Throat, Larynx, and Maxillary Sinus were shown by Drs ANDREW WYLIE, W. STUART-LOW, W. S. SYME and GAY FRENCH.—Dr Wylie's patient, a female, aged 56, suffered from endothelioma of the tonsil. It was removed mainly by snaring five months before, and the patient had increased in weight since the operation.

In the discussion, Mr Dawson referred to a similar case treated in the same way, the patient being well six months later. Dr William Hill referred to the value of diathermy in this situation, and Mr Norman Patterson emphasised the use of radium in tumours of mesoblastic origin.

Dermoid Fistula of Nose, by W. STUART-LOW.—A woman with a minute fistula over the middle of the dorsum of the nose.

In the discussion the speakers pointed out the difficulty in curing many of such cases. It was not always easy to remove the whole lining membrane of the cyst, unless great care was exercised; consequently, the fistula might remain in spite of operation.

Recurring Spheno-Choanal Polypus in a Child, by IRWIN MOORE.—Child, aged 8, shown at the meeting, 2nd February 1917. The condition was rare in so young a patient. The original polypus coming from the left sphenoidal sinus was a soft fibroma. The recurrence consisted of two polypi on separate pedicles.

Case of Long Frænum Linguae, by IRWIN MOORE.—A boy, aged 13, was able to roll the tip of his tongue backwards and insert it into his nasopharynx.

A Fork accidentally swallowed and impacted in the Pylorus, by WILLIAM HILL and K. A. LEES.—A young woman, aged 25, in attempting by means of a fork to dislodge food which had stuck in her throat, lost her grip of the fork, which disappeared. She had held the fork by the prongs. The X-rays showed the fork in the pylorus. It was removed by Mr Lees through a small incision in the epigastric region.

Cases, Casts, Photographs, and Diagrams illustrating some methods of Repair of Wounds of the Nasal Cavities and Nasal Accessory Sinuses were shown by Mr G. SECCOMBE HETT.—These cases must be studied in the original text as they cannot be satisfactorily abstracted.

Societies' Proceedings

March 7, 1919.

Three cases of simple tumour of the larynx were shown:—
Adenoma of the Left Vocal Cord, by Dr A. L. MACLEOD;
Angelioma of the Left Arytenoid, by Dr G. W. DAWSON;
Polypus of the Anterior Commissure, by Dr DUNDAS GRANT.

In the discussion on the first case, exception was taken by Dr Andrew Wylie to the term, adenoma of the vocal cord, as there is no glandular tissue in that structure. The glands lay on the outer or ventricular side of the cord.

Choanal Polypi in Children: (1) a boy, aged 9; (2) a girl, aged 12, by Dr DOUGLAS GUTHRIE.—In both cases the antrum was opened; in the first, an intranasal operation was done; in the second, the cavity was opened through the canine fossa.

In the discussion it was pointed out by several speakers that the removal of the polypus without interference with the antrum, especially in young people, was, in the first instance, sufficient.

Two Cases of Pharyngeal Pouch, by Dr WILLIAM HILL and Dr DUNDAS GRANT.—Dr Hill's case shown at the meeting of the Section on 7th December 1917. Both cases were treated by freeing the pouch, sewing it up and anchoring it by stitches under the sterno-mastoid muscle (diverticulo-pexy). If the results are not found to be satisfactory, a second operation can be done and the pouch removed. In the interval adhesions have formed, the mediastinum is shut off, and with that, the risk of mediastinitis.

Epithelioma of the Epiglottis, treated by Diathermy, by Dr R. A. WORTHINGTON. Healing was rapid and dysphagia was completely relieved. Four months had elapsed since the operation.

Foreign Body removed from the Nose after Thirteen Years, by Dr R. A. WORTHINGTON. A piece of stick with bark on it did not show evidence of disintegration.

Dr JOBSON HORNE related a case of rhinolith, the nucleus of which was a piece of cotton wool which had been inserted thirty years previously.



ABSTRACTS

E.A.R.

Fractured Skull, with Secondary Mastoiditis, Meningitis, and Brain Abscess. MORISSET SMITH. (*The Laryngoscope*, September 1919, p. 552.)

CASE I.—Male, aged 43, fell from the seat of a hansom cab, was picked up unconscious, bleeding from both ears, blood mixed with cerebro-spinal fluid. Spinal puncture revealed blood-stained fluid under pressure. Reflexes exaggerated. Temperature 102. Œdema of both discs. Operation two days later by Dr Sharpe: left sub-temporal decompression. The clot was subdural. Wound closed with two drains. Patient regained consciousness four hours after operation. Sixteen days later Smith found a tender post-auricular swelling (right), profuse discharge, neck rigid, Kernig sign present, spinal fluid cloudy; temperature 101. Second operation: mastoid cortex showed a fracture running below the temporal ridge forward to spine of Henle. Mastoid cavity filled with pus. Death two days later from meningitis.

CASE II.—Female, aged 40. Bleeding from right ear after an automobile accident, 31st October 1917. Examination showed ecchymosis of both orbits, mastoid regions, neck, trunk, and extremities. Cerebro-spinal fluid under pressure and bloody. Temperature 101.6. Three weeks after admission Smith found mastoiditis with post-auricular tenderness, profuse meatal discharge, positive Kernig and cloudy spinal fluid. Two weeks later Smith exposed the cortex and found a fracture running forward to the spine of Henle. He only removed the cortex, avoiding the use of hammer and chisel. The patient went home in two months, mastoid completely healed. Later she developed epileptic seizures, which began in the face, right arm, and leg. Three weeks later there was right facial paralysis, motor and sensory aphasia, increased reflexes (right arm), headache, tenderness over left fronto-parietal region. Second operation (Dr Sharpe): Left subtemporal decompression and drainage. Large abscess cavity found (pure culture of streptococcus). Patient died of meningitis three weeks later.

J. S. FRASER.

Preventative Mastoidotomy. GAVIN YOUNG. (*Glasgow Medical Journal*, July 1920.)

Long continued suppuration in the middle ear results in either (1) death through intracranial complication, or (2) increasing deafness, or (3) constant ill-health from long continued sepsis.

Abstracts

Such conditions may be avoided by (1) palliative treatment, incision of the membrane and antiseptic treatment of the middle ear, pharynx, naso-pharynx, and orifice of the Eustachian tube; but if there is no improvement after one month of such treatment, (2) operative treatment must be carried out at once. In acute cases either a cortical operation (Schwartz) must be performed, or the conservative mastoid operation, which aims at draining the antrum into the meatus. In chronic cases of suppuration of the middle ear, either a radical or conservative mastoid should be performed; the former where cholesteatomata, tubercle or Vincent's bacilli, or recurring polypi are present, but in cases where the hearing is worth preserving, as when the conversation voice can be heard at more than three feet, the latter operation should be advised.

The chief point is, that if good results are to be obtained operations should be performed early in the disease, and as the great majority of the cases occur after scarlet fever and measles, the writer suggests that every fever hospital should have a skilled aurist on the staff.

ANDREW WYLIE.

Mastoiditis and Suboccipital Pott's Disease. G. PORTMANN. (*Revue de Chirurgie, Ann.* xxxviii., No. 9-10, 1919.)

The author, in an interesting communication, draws attention to the similarity between certain types of mastoiditis and tuberculosis of the cervical vertebræ. He describes in detail a space which he calls the cranio-cervical fossa. This fossa is bounded above by the lower surface of the petrous bone, internally by the upper part of the vertebral column, and externally by the styloid process and the muscles and ligaments attached to it, and more posteriorly the inner surface of the mastoid process. Pus may reach this space either from a perforation of the cortex of the petrous bone or from caries of the cervical vertebræ. The author reports three cases in which cervical Pott's disease was mistaken for mastoiditis. He draws attention to the seriousness of such a mistake, since in mastoiditis free intervention is necessary, while in caries of the cervical vertebræ this is very undesirable as mixed infection is liable to follow, with very serious, if not fatal, consequences to the patient. Pus in this situation must be aspirated through healthy tissue and treated on the lines generally adopted for surgical tuberculosis.

J. K. MILNE DICKIE.

The Reliability of the Nystagmus Tests. Major FISHER and Captain HAROLD BABCOCK. (*Journ. Amer. Med. Assoc.*, Vol. lxxii., No. 11, 15th March 1919.)

The authors give results of a series of experiments in which individuals were subjected to frequent rotation in the turning-chair,

Ear

so that it could be determined, first, what effect, if any, such frequent and continuous rotation would have on their after-turning nystagmus.

1. The duration of after-turning nystagmus is not impaired by flying. A very large number of aviators have been re-examined so as to make this conclusion absolute and final.

2. From the evidence on hand, it would seem that in acrobats, whirling dancers, and athletes in general, there is no diminution of the nystagmus response.

3. Repeated turning experiments on normal persons occasionally produce an "apparent" and slight shortening of the nystagmus, but that this is only apparent and not real is demonstrated by the convex glasses.

4. In medical practice, an absence or impairment of the nystagmus responses to ear stimulation indicates definitely a pathological condition within the vestibular mechanism.

PERRY GOLDSMITH.

Decrease of After-Nystagmus during Repeated Rotation. COLEMAN

R. GRIFFITH. (*The Laryngoscope*, 1920, Vol. xxx., p. 129.)

It has been commonly observed that long persistence in whirling movements may reduce in intensity the distressing symptoms of dizziness. This has suggested that the accompanying ocular movements may also tend to disappear. Whirling dancers are frequently undisturbed by the swimming and giddiness. Griffiths found that subjects who were rotated for about three minutes daily during two or three weeks, lost, either wholly or in part, the "after-nystagmus." Fisher and Babcock have come to an opposite conclusion. They admit, however, a certain amount of reduction of the duration of after-nystagmus, and this they explain by the voluntary "gaze-fixing" of "a few subjects." In order to investigate the value of such assertions, Griffith chose the white rat as a subject for experiment. The lack of a fovea and of distant vision provide the best conditions of non-fixation. The rat was placed under a glass jar and the platform was rotated by a motor. It was found that the nystagmus was directly proportional to the *number* of rotations and to the *speed* of rotation. Each rat was rotated a like number of times to the right and later to the left, and averages of the duration of the nystagmus after stopping were computed. Griffith found a rapid decrease of after-nystagmus from day to day. Within ten to eighteen periods of rotation the nystagmus had completely disappeared. The number of ocular movements upon the first rotation varied between eighteen and twenty-five. This rapidly decreased during the first five periods to between five and eight, and soon became reduced to a single movement which generally remained for some time. Two of the ten rats gave anomalous

Abstracts

results: these two were females, rotated during the period of gestation. Griffith believes that this points directly to the fact that nystagmus is closely related to the organic condition of the individual, and he suggests that further investigation upon this matter might be useful.

The white rat is a nocturnal animal, and experiments showed that morning nystagmus is invariably longer than that after evening rotation.

During the first days of the experiments, most of the rats showed a tendency to excessive defecation and micturition. Neither occurred late in the series. Trembling was common to most of the subjects for two or three days after the series had been started, and in the case of some of the subjects was the last observable response to the rotation.

As rotation takes place for the first time, two kinds of response are in evidence: (1) The rat may make frantic efforts to move in the direction contrary to rotation. When the rotation ceases the rat turns just as vigorously in the opposite direction. These attempts always cease in five or six seconds. (2) The head is at first turned far in the direction against rotation and swings to the opposite side as rotation ceases. This phenomenon also passes off.

The scratch-reflex affords an excellent indication of the intensity of the bodily disturbance present during and after rotation. Early in a series, a scratch-movement initiated before rotation is suddenly arrested as rotation begins. At the end of the series, an accurately localised scratch-movement was begun and carried to completion by several of the animals.

J. S. FRASER.

The "Pointing" Test in the Examination of Candidates for Aviation.

A. MALAN. (*Arch. Ital. di Otol.*, xxx., 3rd Sept. 1919.)

The author makes use of a modification of the "pointing" test and records briefly the results obtained in the examination of 200 candidates. His technique is somewhat different from that of Bárány, Jones and Fisher. A turning-chair is used which has been improved by the addition of a controlling wheel geared up to the axis of rotation. The rotation and stopping of the chair are carried out with greater ease than is the case with other patterns. A horizontal board is fixed to the front of the chair about 25 cm. above the knees of the patient and on this is placed a paper marked with concentric rings like a target. The centre of the target is 6 cm. in diameter and the rings are at distances of 3 cm. apart.

The patient is given a pencil of a different colour in each hand. His eyes are bandaged, and the head fixed to a support. He is shown the centre of the target and told to touch the centre with each hand alternately ten times, raising the other hand over

Ear

the head each time. Different coloured pencils are given him and he is rotated ten times in fifteen seconds and the test repeated. He is next rotated in the other direction, and a third test made with different pencils. This gives an exact graphic record of the deviations.

In the series there was absence of deviation in 16 per cent. of normal individuals. The reactions in normal persons are divided into the following types: (1) The classical reaction of Bárány, (2) the inverse type, (3) convergent, (4) divergent, and (5) irregular.

The classical reaction, *i.e.* deviation to the right after rotation to the right, and *vice versa*, occurs only in people with sensitive labyrinths or nervous systems. The inverse reaction, *i.e.* deviation to the left after rotation to the right, is not very common and occurs in normal individuals with sluggish labyrinths. In the divergent reaction the patient touches the centre at first, but with each succeeding attempt diverges farther from the centre. This is characteristic of extremely excitable labyrinths or central nervous system. In the convergent type, the patient deviates widely from the centre at first and then approaches it with both hands. This occurs in slight degrees of neurasthenia, while the irregular forms occur in more marked cases of neurasthenia. The latter give very variable results both as regards direction and degree.

J. K. MILNE DICKIE.

The Teaching of the Deaf. MAX A. GOLDSTEIN. (*The Laryngoscope*, September 1919, p. 503.)

Goldstein gives an account of the Society of Progressive Oral Advocates, which includes members of the teaching and medical professions, psychologists, social service workers, parents and friends of the defective child, and others. The care and instruction of the deaf and of those with defective speech urgently calls for attention. After the war experienced teachers of the oral method carried out practical work in re-education by Lip-reading and Corrective Speech. The Society has unanimously adopted a resolution to *make impaired hearing in children reportable*. This was enthusiastically received at a meeting of the Section on Otology and Laryngology of the American Medical Association, and a permanent committee (Richardson, Kenyon, and Goldstein) was appointed to take charge of questions affecting the health and the education of the child defective in hearing or speech. The next step is "Standardisation of Schools for the Deaf." The ultimate and general acceptance of Oralism depends largely on the qualifications of oral teachers and the results of their work. The invincible weapon with which to contend against the manualist, the signer, and the "combiner" is not argument, criticism, or politics, but the deaf child intelligently trained in good, fluent, comprehensible

Abstracts

normal speech. Goldstein carried out this plan before the State Legislature of Iowa. With the aid of nine orally taught children he demonstrated practically "to the sturdy legislators of this good State what speech and lip-reading and oral training actually meant." The money was voted without delay.

At a survey made of the City of St Louis about a year ago, it was found that over two thousand of the children attending the public schools of the city had some form of defective speech of varying degree. School authorities have not yet successfully disposed of this question, owing to lack of funds, lack of information, and lack of sufficient and properly qualified teachers. J. S. FRASER.

Bone Conduction of Sound in Cetacea, and its Relation to Increased Bone Conduction in Human Beings. JOHN D. KERNAN. (*The Laryngoscope*, September 1919, p. 510.)

One of the most important symptoms of chronic middle ear catarrh is the relative and absolute increase of bone conduction. Several theories are advanced concerning the phenomenon. (1) (Bezold's). In consequence of the changes within the middle ear tensing of the fibres of the ligamentum annulare renders possible an easier conduction of sound waves coming through the bone. (2) Sound waves coming through the bone are transmitted directly to the structures within the cochlea. (3) With closure of the external auditory meatus, the air within the tympanum receives the sound vibrations from the bony walls of the cavity and transmits them increased in force to the foot-plate of the stapes, the closed cavity acting as a resonance box.

Whalers testify as to the ability of whales to hear water-borne sounds. In hunting the animals no precaution need be taken as to air-borne sounds, such as conversation. Sounds which are carried through the water, however, such as splashing of oars, or blows against the sides of the boat, must in every way be avoided. Whales have an auditory apparatus, typically mammalian, which was originally designed to receive air-borne sounds but has been modified to receive water-borne sounds. The external meatus has been practically closed, the drum membrane fixed and the ossicles rendered immovable through fusion of the malleus to the os tympanicum. Sounds are evidently transmitted to the cochlea through the solid tissues of the head. The periotic and tympanic bones are but loosely connected to the other bones of the skull. Thus they can receive only such sound waves as impinge directly on themselves. Since the malleus is firmly fused to the tympanic bone it shares its vibrations, and transmits them, through the other ossicles, to the oval window. Sound waves impinging on the mastoid are transmitted through the chain of

General Notes

ossicles to the cochlea, the endolymph being put into motion through the foot-plate of the stapes as in other mammals. The tympanic and periotic bones are surrounded by numerous cells containing air which is set in motion by the vibrations of the hearing bones. These air cavities form a kind of sounding box. Any change, such as a thick, tense, rigid drum-head, which connects the ossicles more firmly to the tympanic ring, approaching the complete fusion found in whales, would increase bone conduction. Kernan accepts also Bezold's idea that it is a thick, tense ligamentum annulare, transmitting vibrations to the foot-plate of the stapes, which explains the phenomenon under discussion. This is the condition following a radical mastoid operation.

When the external canal is slightly blocked, bone conduction is increased. This is explained by conceiving the air-filled cavity with bony walls to be a sounding box. This is just what we have present in cetacea.

J. S. FRASER.

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GENERAL NOTES

THE ÓNODI COLLECTION

THE attention of the readers of the Journal is drawn to the appeal which has been made by a Committee of Fellows of the Royal Society of Medicine for the purpose of raising a sum of money necessary to purchase the valuable collection of anatomical dissections made by the late Professor A. Ónodi of Budapest.

"It is no figure of speech to refer to this as a 'unique' collection and the most valuable of its kind in the world, and although the movement to secure it was originated by the Laryngological Section of the Royal Society of Medicine, its interest is by no means limited to Laryngologists and Rhinologists, as it contains specimens of profound interest to Otologists, Ophthalmologists, Odontologists, and even to general Surgeons, especially those dealing with the surgery of the head and brain."

The collection, which consists of 450 dissected specimens, will be suitably mounted and preserved in the Museum of the Royal College of Surgeons of England, where it will be available to all for the purpose of study. It would be very unfortunate if, for want of the necessary purchase money, the collection were to pass into the care of other hands.

Subscriptions should be sent to the Honorary Secretary and Treasurer, Mr Philip Franklin, 27 Wimpole Street, London, W. 1.

General Notes

PUBLICATION OF THE PROCEEDINGS OF THE SECTIONS OF LARYNGOLOGY AND OTOTOLOGY, ROYAL SOCIETY OF MEDICINE

The Editors of the Journal are desirous of overtaking the arrears in connection with the publication of the Proceedings of the two Sections. The delay in their appearance has arisen as a natural consequence of the difficulties connected with publication during the war. In order to effect the above it will be necessary to publish the account of the Meetings held during 1919 and 1920 in a very condensed form, but the readers of the Journal will benefit eventually, when the lost ground has been made up and the Proceedings of the Sections begin to appear soon after the date on which the Meetings were held.

ROYAL SOCIETY OF MEDICINE,
1 Wimpole Street, London, W.

Section of Otology (President, Sir Charles Ballance).—The next Meeting of the Section will be held on Friday, 21st January 1921. All notices of papers and specimens should be sent to the Secretaries, Lionel Colledge, 22 Queen Anne Street, W. 1, or Norman Patterson, 24 Park Crescent, London, W. 1.

Section of Laryngology (President, Dr W. Jobson Horne).—The next Meeting of the Section will be held on 4th February 1921, at 4 P.M. Members intending to show cases or specimens should send in their notes a fortnight before that date to the Hon. Secretaries, C. W. M. Hope, 22 Queen Anne Street, W. 1, or W. G. Howarth, 75 Harley Street, London, W. 1.

The Summer Congress of the Section of Laryngology.—The Third Annual Summer Congress of this Section will be held on Thursday and Friday, the 2nd and 3rd of June 1921. Should it be found necessary, the Session may be resumed on Saturday, 4th June. Papers may be read, as well as patients and specimens shown. A Museum will be formed in connection with the Meeting, and the Annual Dinner of the Section will be held on the evening of Thursday, 2nd June.

THE JOURNAL OF LARYNGOLOGY AND OTOTOLOGY, LTD.

A Limited Liability Company with the above title has been registered. Response to the appeal for Capital has been very encouraging. Members of the Sections of Laryngology and Otology who may not have received notice, or who have omitted to reply, are advised to apply for Shares (£5 each) without delay to Messrs Morris, Veasey & Co., 40 King Street, London, E.C. 2. The first meeting of the Company, to elect Directors and allot Shares, will be held at 1 Wimpole Street on 21st January at 3 p.m.

OBITUARY

ÉTIENNE LOMBARD. (PARIS, 1869-1920)

(*A Translation*)

LOMBARD has died in Paris from a painful disease which, for two years, has prevented him from following his profession.

He began as assistant at the Lariboisière Hospital under Dr Gouguenheim and, on the death of the latter, he served under Professor Sebileau. In 1902, he obtained the title of "Oto-Rhino-Laryngologiste des Hôpitaux de Paris." This was a new creation, as the specialty had not previously been recognised officially in the Paris School, but Lombard's high reputation and his brilliant lectures at once gave prestige to the new title—indeed it might be said that he added more to it than the title bestowed on him.

Lombard continued to work at the Lariboisière Hospital for ten years. While there he familiarised himself with surgical technic, with which specialists were not so well acquainted twenty years ago as they are to-day. He designed some modifications in the mastoid operation, a new method of approaching the lateral sinus, and other improvements. Lombard's bone forceps are well known.

But as his talents leaned more to physics than to biology, he soon turned his attention to the pathology of the labyrinth, and in the latter part of his life he devoted most of his activities to the study of the internal ear.

His acoumetric researches led to the discovery of a very important symptom in labyrinthine deafness, commonly called "the symptom of the raised voice," or "Lombard's symptom." As a consequence of this, great assistance was given to the diagnosis of simulated deafness, and it is therefore in much use in medico-legal cases.

At the same time he occupied himself actively in the publication of the *Annales des Maladies de l'Oreille*, and from the year 1903 he was associated with Lannois, Lermoyez, and Sebileau in this monthly journal.

In 1911, Lombard was put in charge of a new service at the Hôpital Laënnec—a model clinic, from his own designs, which might well serve as a pattern in hospital equipment. There he worked with his faithful assistants, of whom no less than three, viz., Baldenweck, Lemée, and Moulouguet, afterwards obtained the title of "Oto-Rhino-Laryngologiste des Hôpitaux de Paris."

During the war the flying men furnished him with abundant material from amongst the "*blesés de l'air*." He made observations and researches on 600 aviators, and we were expecting from him

Obituary

a sensational discovery on dynamic equilibration when his fatal illness put an end to his career.

Death is hard for a worker when it strikes him down in the mid-course of his existence. In vain has he freely sown, in vain has he laboriously cultivated the field of his activity, if he reaps no harvest; for he never tastes the joys of a fruitful autumn nor the rest and calm of the winter which ends a happy life.

MARCEL LERMOYEZ.

RAYMOND VÉREL, O.B.E., M.B., F.R.C.S.E. (ABERDEEN).

By the death of Raymond Vérel, on 29th September 1920, the specialty in this country has lost one of its young, active, and most promising members. After graduating with honours at Edinburgh University in 1908, Vérel held several general hospital appointments, and also acted as clinical assistant to Dr Logan Turner for eighteen months. He decided to devote himself to the study of Diseases of the Ear and Throat. He proceeded to Vienna for further training, and finally settled in Aberdeen shortly before the outbreak of war. In the autumn of 1914 he effected a transference from the 1st Scottish General Hospital to the Scottish Horse Mounted Brigade Field Ambulance, and served with his comrades at Suvla on the Gallipoli Peninsula. Though invalided home after a severe attack of dysentery, he again saw service in the Desert of Sinai and later in Egypt, where he was made consultant in his special branch. He served with distinction, and his work and skill were thoroughly appreciated by the numerous patients who passed through his hands. It was not until the summer of 1919 that Vérel was released from his military duties and was able to resume his practice in Aberdeen, where he was almost immediately appointed Aural Surgeon to the Dispensary and to the Royal Hospital for Sick Children, and Lecturer on Diseases of the Ear and Throat.

Unassuming and modest in his bearing, gentle in his handling of children, who seemed specially attracted to him, and possessing a sound knowledge of his subject, he readily gained the respect and confidence of his colleagues and patients. His skill as a manipulator was increased by the fact that he was ambidextrous, a valuable asset to the student of laryngology. To a man of Vérel's personality and professional ability, a successful career was assured. But it has been otherwise decreed, and the promise of these earlier years cannot now bear fruit.

"They shall not grow old, as we who are left grow old;
Age shall not weary them, nor the years condemn."

A. LOGAN TURNER.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

ANGEIOMATA OF THE LARYNX.

By IRWIN MOORE, M.B., C.M. Edin., Surgeon to the Hospital
for Diseases of the Throat, Golden Square, London.

*A Study of all the Cases recorded in Literature, with Special Reference to the
Question of Hæmorrhage and Treatment of these Tumours.*

(Continued from page 26.)

Wyatt Wingrave,¹⁰ in 1906, at a meeting of the British Laryngological, Rhinological and Otological Association (5th Jan.), exhibited the specimen of a small angioma removed by Chichele Nourse from the left vocal cord of a man, aged 43. It consisted almost entirely of dilated blood-vessels with very thin walls, held together by white fibres, a few elastic fibres and fixed connective tissue cells. Some of the vessels contained old white clot, laminated and organising, whilst in a few the clot was recent. The surface was covered with normal stratified epithelium.

Carter⁵² (New York), in 1906, reported a case to the Section of Laryngology and Rhinology, New York Academy of Medicine. The patient was a girl, aged 19 years, who had for several years been subject to attacks of hæmoptysis. Eight months previously, hoarseness began, which steadily increased, with attacks of coughing. The tumour was round, smooth, non-pedunculated, bluish-red in colour, somewhat smaller than a wild cherry, and was situated on the right vocal cord, near the anterior commissure. Expectant treatment was advised.

Vitto-Massei⁵³ (Naples), in 1906, recorded a large greyish-black tumour of the left sinus pyriformis in a man, aged 50, which covered the whole larynx, and proved to be a connective tissue growth poor in cells, and containing cavernous spaces. The patient had suffered for four years from attacks of dyspnoea, which gradually became worse.

Irwin Moore

The tumour was removed by preliminary tracheotomy and the galvano-cautery. It consisted of newly formed blood-vessels and venous blood-spaces. The connective tissue cells were very scanty, and the cavernous spaces showed homogeneous bands, which exhibited signs of hyaline degeneration.

An excellent coloured microscopical figure of this growth, which was a typical cavernous angioma, is given in Vitto-Massei's publication on page 114. This article also contains the Bibliography of all cases of Angiomata of the Larynx recorded by Italian authors.

Grünwald⁵⁴ (Münich), in 1907, refers to two cases.

In the first case no details are given, only a description of the microscopical section, illustrated by a coloured drawing (Plate XIV., Fig. 1), a typical picture of a true angioma. The patient was said to be a male, aged 48, who complained of hoarseness and severe cough.

The second case also appears to be a male, aged 48. The larynx was of a somewhat deeper colour than usual, with a dense round tumour projecting from the centre of the inter-arytenoid region into the lumen (see Plate III., Fig. 8). It was about the size of half a bean, and had a broad base, the surface being nodular, irregular, and bluish-red in colour. On phonation the tumour prevented full adduction of the vocal cords.

Grünwald mentions that the site and appearance of the growth led to the assumption that it was a tuberculous tumour. He removed a piece for microscopical examination with a snare. It proved to be an angioma. A beautiful coloured drawing of the larynx is shown on Plate XXXVII., Fig. 3.

Malzew⁵⁵ (Hungary), in 1907, described a cavernous tumour he had seen, which weighed 14 grams. It was situated on the arytenoid cartilage, and hung down into the entrance of the larynx. He removed it with the galvano-cautery snare.

Hirsch⁵⁷ (Vienna), in 1908, reports the case of a female, aged 22, who complained of hoarseness for one and a half years. A tumour, dark bluish-red, with a blackberry-like upper surface, was seen involving the whole right ventricular band and covering the cord. On phonation the posterior portion of the vocal cord was free. Another tumour, the size of a bean, was present on the anterior third of the left vocal cord, including the ventricular opening. Longitudinal furrows were present in the growth on the right side (see Plate III., Fig. 9). Pressure on the neck caused increase in size of the tumour, showing some connection with the vascular system. Hirsch says of his case that angiomata of this size are very rare, and have been observed only in two other cases, those of Kriege and Mayer. Kriege's case exhibited a tumour similar in size to that of Hirsch, and it also resembled the latter in position, colour, and formation,



FIG. 8.
Inter-arytenoid Angioma.
(Grünwald.)

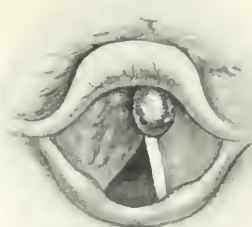


FIG. 9.
Bilateral Angioma.
(Hirsch.)



FIG. 10.
Angioma of Left Vocal Cord.
(Horn and Möller.)



FIG. 11.
Angioma of Right False Cord
and inter-arytenoid region.
(Hamilton White.)

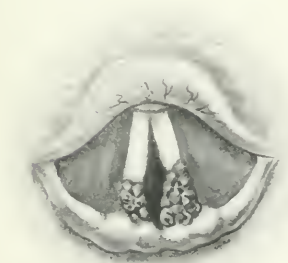


FIG. 12.
Bilateral Angioma.
(Ryerson.)



FIG. 13.
Angioma of Left False Cord.
(Emil Mayer.)

Angeiomata of the Larynx

and in the fissures. There were no symptoms, and it was accidentally discovered.

Horn and Möller¹⁷ (Copenhagen), in 1908, remarked that 35 cases had been recorded, of which perhaps not all may be pure angeiomata.

They report one case of their own, a male, aged 44, who suffered from tuberculosis of the lungs. Hoarseness had existed for a long time, accompanied by a bi-toned voice, similar to that of recurrent paralysis. The tumour, which was bluish-red, was attached by a leaf-like pedicle to the margin of the anterior two-thirds of the left vocal cord. It was a pedunculated growth with a smooth surface, larger than a hemp-seed, and movable, which lay on the upper surface of the left cord, and sometimes projected into the rima glottidis (see Plate III., Fig. 10). The patient died of tuberculosis.

Microscopically, the tumour consisted chiefly of irregular cavities, filled with blood and fibrinous deposit, and separated from one another by thin connective tissue septa. The walls were covered by endothelium. The cavernous spaces were limited to the tumour itself, and did not extend into the pedicle, which was formed of the two layers of mucous membrane near the submucosa. It was a typical cavernous angeioma.

Hamilton White,⁵⁸ in 1908, reported from Chiari's Clinic the case of a male, aged 25, who suffered from slight hoarseness, with a feeling of tension in the region of the larynx, and a little coughing, which had only existed for ten weeks.

On examination of the larynx a small dark blue tumour, like a broad bean, and with a diameter of 1 cm., was seen in the inter-arytenoid region. The right ventricular band was slightly enlarged, and another tumour occupied its margin, which covered the right processus vocalis, and originated from the lower surface of the whole ventricular band, and filled the ventricle of Morgagni (see Plate III., Fig. 11).

A thyro-fissure was performed by Chiari, preceded by tracheotomy. The tumour was separated from the neighbouring tissues by means of a raspator, and removed by a galvano-cautery snare. Slight hæmorrhage occurred, immediately arrested by cauterisation of the surface of the wound. A tampon was inserted and removed on the sixth day. The tracheotomy tube was removed on the ninth day. Chiari, from the histological examination, considered the possibility that it was not a true angeioma, but a very vascular fibroma or papilloma. Hamilton White thinks it was a congenital tumour. The result in this case was most satisfactory.

Blegvad⁵⁹ (Copenhagen), in 1908, reported to the Danish Oto-Laryngological Society the case of a male, aged 35, with a pedunculated

Irwin Moore

angioma on the middle third of the left vocal cord. The patient had been hoarse for a few months, improved by a sudden expectoration of blood. The tumour was the size of a millet-seed, with a white and irregular surface. It was removed by a cold wire snare with only a little bleeding.

Navratil⁶⁰ (Budapest), in 1908, exhibited a case before the Rhinology Laryngological Section of the Royal Hungarian Medical Society of Budapest. A woman, aged 31, had an angioma of soft consistence, the size of a nut, projecting over the left vocal cord. There was some stridor, and the case had been under observation for nine months. On account of the difficulty of respiration von Navratil was considering removal by laryngo-fissure.

Porter⁶¹ (Edinburgh), in 1910, reported a case in a male, aged 33, who had suffered from hoarseness for six months. The tumour was situated on the anterior part of the left vocal cord, covering rather less than half, and appeared to be growing out of the ventricle, whilst the false cord was stretched over the tumour. It prevented the complete adduction of the cords. The growth was diagnosed from its colour. The first attempt to remove it with forceps failed, but later it was removed in pieces with cutting forceps at two sittings.

Safranek¹³ (Budapest), in 1911, reports two cases, which he terms "hæmangiomas." One was in a woman, aged 27, who had suffered from hoarseness since childhood. A small pedunculated angioma, the size of a small peppercorn, extended from the middle third of the left vocal cord, near the free margin of the vocal process. Its upper surface was smooth. The other case was in a woman, aged 57, who for six months had suffered from slight hoarseness and cough, but no expectoration of blood. On the right arytenoid cartilage was a small tumour with a broad base and irregular surface, like a blackberry. Pressure on the neck enlarged the tumour, and the vessels became engorged.

Pistre⁶² (Grénoble), in 1911, also reports a cavernous angioma of the right vocal cord in a man, aged 45, on the free border and upper surface of its anterior one-third. It was rounded, the size of a small pea, with a short and thin pedicle, and of a reddish-brown colour. The patient's voice had lost its normal tone for four or five years, but there was no dyspnoea. It was removed under cocaine by means of forceps, and its base cauterised with chloride of zinc. There was no appreciable hæmorrhage.

Thurber⁶³ (New York), in 1911, reported before the Laryngological Section of the New York Academy of Medicine the case of a male, aged 31. For three years the patient had suffered from hoarseness following a cold, but there was no dyspnoea. A purplish, very vascular-looking tumour, half an inch in diameter, protruded from

Angeiomata of the Larynx

the right ventricle in its anterior half, and covered the laryngeal opening. Bleeding had only occurred on one occasion. Microscopically the growth proved to be an angeioma.

In a discussion on this case, Emil Mayer advised thyro-fissure for removal of the tumour, while Simpson considered the chances of hæmorrhage were not very great and recommended removal by the snare.

Toubert⁶⁴ (Lyons), in 1912, reports the case of a male, aged 21, who three years previously suffered from laryngitis, followed by hoarseness, dyspnœa, and later suffocation. Two small nodules, about 1 cm. in diameter, were situated between the lips of the glottis, and extended subglottically. They were removed by thyro-fissure, preceded by tracheotomy. Toubert refers to the superiority of this route over the endo-laryngeal.

Roux⁶⁵ (Toulouse), in 1912, reported three cases occurring on the vocal bands, and a fourth one at the tip of the left arytenoid.

Ryerson⁶⁶ (Toronto), in 1912, also recorded a case in a female, aged 52. The growth was of a diffuse character, and situated mainly on the left side, on the ventricular band and along the external margin of the vocal cord, bluish-purple in colour, and lobulated like a small raspberry. Another similar tumour was situated on the anterior surface of the right arytenoid, and extended beyond it (see Plate III., Fig. 12). The patient had occasional difficulty in breathing, but none in swallowing.

Ryerson refers to the "disastrous effect of operative interference with these tumours."

He employed radium by means of a special disc applicator, introduced into the larynx, containing 3 mg. radium activity 1,000,000, which was applied at intervals of three months for a year. At the end of this time considerable improvement had taken place. He then applied 10 mg. activity 500,000 at the same intervals. A year later the tumours had disappeared, leaving only two small cicatricial nodules. On account of the difficulty in keeping the radium in position, it was only possible to apply it for three minutes at a time (generally only one minute). Ryerson found that angeiomata and nævi resist radium in direct ratio with the age: the older the subject the greater the resistance.

Phillips and Ruh¹¹ (Cleveland, U.S.A.), in 1913, reported a case of angeioma simplex in a male baby, aged 9 months, who suffered from difficulty in breathing and hoarseness, following an attack of measles. Pneumonia followed a few months later, and the patient died.

Post-mortem examination showed chronic catarrhal laryngitis, and a reddish-grey growth with an irregular and granular surface,

Irwin Moore

extending from the true vocal cord down to the third ring of the trachea. Also a larger growth of a deeper red colour and with a more irregular surface, opposite the lower border of the thyroid cartilage, which had caused stenosis.

The microscope showed increase in all the elements, more especially the fibrous connective tissue. Numerous thin-walled, engorged and tortuous vessels were present, and filled with blood. The glandular elements were hyperplastic, and embedded in œdematous infiltrated fibrous connective tissue.

Martuscelli and Porfidia⁶⁷ (Naples), in 1914, reported the case of a male, aged 32, who had suffered from attacks of asthma for a long time, with dyspnœa and occasional suffocating attacks.

A large pedunculated tumour filled the aperture of the larynx almost completely. It was soft in character, the size of a chestnut, with its base below the vocal cords. (The exact origin is not stated.)

The first attempt with Mackenzie forceps failed; a second attempt was successful. Considerable bleeding followed, controlled by frequent applications of cocaine and adrenalin.

The tumour was found to have undergone hyaline and amyloid change.

Emil Mayer¹² (New York), in 1916, recorded the case of a female, aged 52, who had been hoarse for a year, except for a period following a profuse hæmorrhage from the mouth, when the hoarseness disappeared. There was some cough, with attacks of dyspnœa on the slightest exertion. The posterior half of the left vocal cord was occupied by a tumour which extended into the ventricle on that side, and over the greater part of the false vocal cord, diminishing the lumen of the larynx considerably (see Plate III., Fig. 13). It was of a dark bluish tinge, and measured 2 cm. in its greatest length, and 1.5 cm. in its greatest width. A diagnosis of cancer had previously been made.

On the ground that endo-laryngeal removal of even a portion of such a growth is fraught with danger, Emil Mayer advised extirpation of the mass by means of thyro-fissure as safe and feasible. The operation was performed by Elsberg under local anæsthesia with cocaine (10 per cent.).

A portion of the thyroid cartilage, the entire left ventricular band, part of the wall of the left ventricle and the posterior half of the left vocal cord, were excised. There was only slight bleeding, which was controlled by the galvano-cautery. The mucous membrane was raised up to the epiglottis and into the saccule, until it was possible to unite its edges with the mucous membrane below the vocal cord, and the continuity of the mucous membrane was restored by interrupted sutures.

Angeiomata of the Larynx

Swain⁶⁸ (New Haven, U.S.A.), in the discussion on Emil Mayer's case in 1916, referred to a case, in a man, aged 50 years, in which he attempted to remove a growth of this kind, and severe hæmorrhage followed. No further details were published.

Levbarg⁶⁹ (New York), in 1918, reported the case of a baby, aged 10 weeks, who was suffering from marked dyspnoea and stridor. Since birth angeiomatous patches had been present on the left temporal region, hard palate, uvula, and neck, and were spreading gradually every day. The larynx was not examined. It was concluded that the dyspnoea was caused by a corresponding condition and intubation was performed, followed by X-ray treatment. A month later the tube was removed and the patient reported as doing well.

[There is no evidence here to show that an angeiomatous tumour was present in the larynx. (Irwin Moore.)]

Dawson,⁷⁰ in 1919, exhibited a case before the Section of Laryngology, Royal Society of Medicine, that of a female, aged 50. The patient had complained for three months of "something sticking in her throat," whilst a little blood was spat up. On examination a round bluish tumour, the size of a nut, was seen on the left arytenoid. He treated the tumour by the galvano-cautery, and considerably reduced it in size. In the discussion on the case, St Clair Thomson suggested that it should be described as a tele-angiectasis, and remarked that there was a great difference between the diffuse condition, which was dangerous to operate upon, and the so-called angeiomatous tumours, which were generally more or less pedunculated and definite. O'Malley considered that it was not an angeiomatous tumour, but rather a permanent hyperæmic condition of a group of vessels on the arytenoid.

M'Kinney⁷¹ (Memphis, Tennessee), in 1919, recorded an interesting case in a male, aged 45, who had been hoarse for five months. There was a history of lues four years previously, and secondary symptoms were manifest. The Wassermann reaction was positive. The hoarseness had been attributed to syphilis, and he had been treated with Salvarsan injections. He had also been treated for tuberculosis.

A subglottic tumour, about the size of a large pea, bluish-red in colour, and with a raspberry-like surface, was seen attached anteriorly beneath the right vocal cord by a pedicle.

The tumour was removed by the indirect method with forceps without great difficulty. It was an angioma.

New and Clark⁷² (Rochester, Minnesota), in 1919, reported three cases from the Mayo Clinic:—

1. A woman, aged 45, who had suffered from intermittent hoarseness for fourteen years. A small sessile tumour, about the size of a pea, was

Irwin Moore

seen attached to the summit of the left arytenoid cartilage, and another attached by a pedicle to the anterior commissure, filling the anterior two-thirds of the glottis. It was bright red and resembled a polyp more than a cavernous angioma. Thyro-fissure was performed and the tumours were removed. The pedunculated growth proved to be an angio-fibroma, whilst the sessile growth was a true cavernous angioma.

[A very excellent drawing of the larynx is given with this case.]

2. A girl, aged 9 months, who had suffered from inspiratory stridor since 3 months of age. A smooth, dark bluish, sessile tumour was seen in the left subglottic region bulging into the middle of the trachea.

Radium was applied outside the larynx in 50 mg. doses, with 2 mm. lead screening, for five hours. When last seen patient was considerably improved.

[It is possible that this tumour was tracheal in origin, and should be classified under growths of the trachea. (Irwin Moore.)]

3. A baby girl, aged 11 weeks, who had been hoarse for five weeks, and gradually getting worse with marked dyspnœa. Cavernous angiomas were present on the right side of the nose, the right inner canthus, the left breast, and over the scalp. The larynx was not examined. Intubation was performed and the tube left *in situ* for sixty-eight hours. Radium was applied not only to the angiomas over the face and scalp, but also over the larynx. This was repeated two months later. All symptoms disappeared and the angiomas of the face and scalp became hardly noticeable.

[The diagnosis of an angioma of the larynx in this case appears to have been based on the clinical history and the possible association of similar growths, hence the case cannot be satisfactorily classified as an angioma of the larynx. (Irwin Moore.)]

Norman Patterson and Pike⁷³ exhibited at a meeting of the Section of Laryngology, Royal Society of Medicine, on 7th May 1920, a female patient, aged 47, with a large supra-glottic tumour. She had suffered from a weak, toneless voice, with occasional noisy breathing, for five or six years. The tumour was slightly lobulated and of a bluish-pink colour. It extended from the left pyriform fossa, over the left arytenoid and aryepiglottic fold, filling the greater part of the larynx. It was not recognised as an angioma. A few days later the tumour was removed by means of suspension laryngoscopy.

At the operation, which was performed under intra-tracheal ether, the tumour (see Plate IV., Fig. 14, A) was found to have a very wide attachment. It was seized with a vulsellum and removed with curved scissors. The hæmorrhage which followed consisted of a general oozing—not excessive, but persistent, and controlled by pressure. The

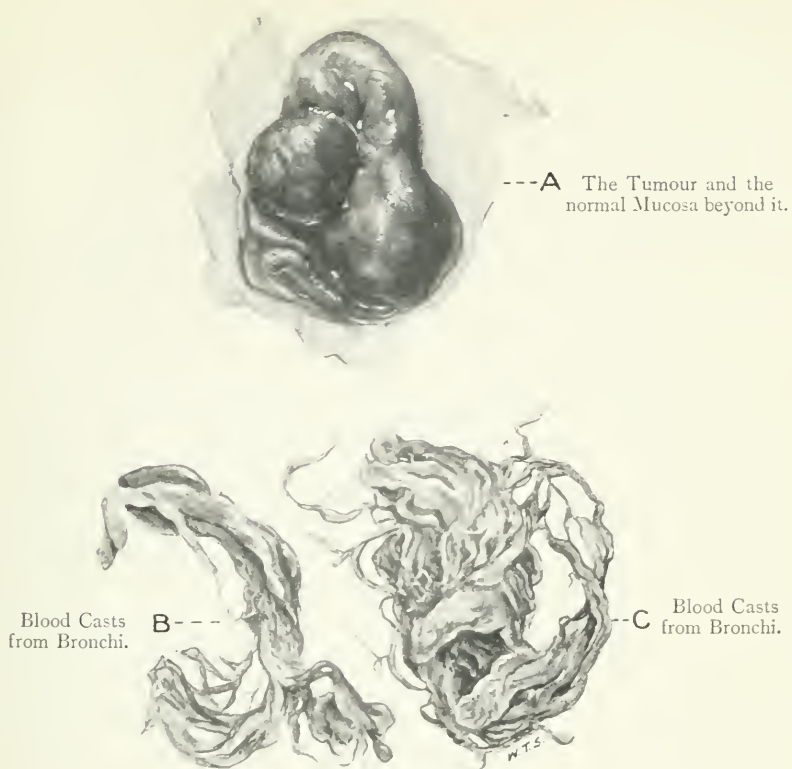


FIG. 14.
Angioma Cavernosum of Left Pyriform Fossa and Aryepiglottic Fold.
(Patterson and Pike.)

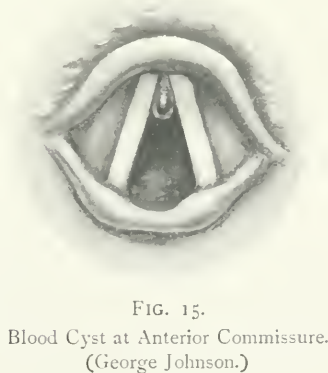


FIG. 15.
Blood Cyst at Anterior Commissure.
(George Johnson.)

Angeliomata of the Larynx

patient was returned to bed, and a few minutes later marked cyanosis and cessation of respiration occurred, caused by a large blood-clot impacted in the trachea (see Plate IV., Fig. 14, B and C), and necessitating an urgent tracheotomy, following which she made an uninterrupted recovery. As Patterson remarks, this case shows the advisability of first performing a laryngotomy or tracheotomy. This is the first case recorded in which an angioma of the larynx has been removed by means of the suspension apparatus.

ATYPICAL OR MIXED CASES, WHICH CANNOT BE CLASSIFIED AS TRUE ANGEIOMATA.

George Johnson,⁷⁴ in 1865, described a blood cyst in a male, aged 50, situated at the anterior angle of the vocal cords. The patient had suffered from hoarseness for more than a year. On inspiration the tumour disappeared below the glottis, and during vocalisation it was drawn upward between the cords, and prevented their close approximation. It was removed by a wire *écraseur*, only an ounce of blood being lost (see Plate IV., Fig. 15).

Fournié⁷⁵ (Paris), in 1867, recorded a "melanotic growth" on the epiglottis. It was destroyed by means of the galvanocautery. In the absence of a definite description it cannot be classified amongst the angiomata.

Fedele⁷⁶ (Turin), in 1878, reported a fibro-angioma of the right vocal cord.

Eppinger⁷⁷ (Prague), in 1880, recorded a "fibroma hæmangiectaticum" of the larynx. Pigmentation in the neighbourhood indicated past hæmorrhage.

Hooper⁷⁸ (Boston), in 1884, recorded a richly vascular papilloma of cavernous structure—a blood-cyst growth. It was nodular, sessile, and situated on the anterior part of the left vocal cord. It was removed by avulsion, and there was no recurrence.

Ariza⁷⁹ (Madrid), in 1887, recorded a large teleangiectatic laryngeal papilloma.

Juffinger⁸⁰ (Vienna), in 1891, reported a varix of the left aryteno-epiglottidean fold.

Grünwald⁸¹ (Münich), in 1907, described the microscopical appearance of an angio-fibroma. (See Plate XIV., Fig. 2, p. 104.) The vascular development was not so extensive as in a true angioma. In this specimen, in spite of obvious dilatation, the cavities could still be described as vessels. Throughout,

Irwin Moore

there was great proliferation of the walls outwards and inwards, endo- and peri-arteritis, which at individual places with extremely concentric growth had led to obliteration of the lumen; at other points there was spur formation in it. The greatly proliferated interstitial tissue was much pigmented. The vessels had also increased in length and were distorted.

The tumour showed its benign character by freedom from recurrence for a long period.

He also gives a microscopical description of an œdematous angio-fibroma. (A water-colour drawing of the section is illustrated on Plate XVIII., Fig. 1, p. 112.)

Hirsch⁵⁷ (Vienna), in 1908, mentioned two tumours, richly vascular, which he did not think ought to be included amongst the true angiomata.

Hooper⁸¹ (New York), in 1891, described the case of a patient (age not stated) who complained of hoarseness dating from a cold four years previously, phonation being almost impossible during the last two months. A tumour was attached to the upper surface of the left vocal cord, and originated also from the ventricle. It had a smooth, mottled surface, and was of a deep red colour, and was removed by means of a snare.

Microscopically it was covered with normal epithelium, and consisted of myxomatous and fibrous tissue, many of the fibres being thickened and hyaline. The growth was a teleangiectatic myxo-fibroma, with hyaline and amyloid degeneration.

LYMPHANGEIOMATA OF THE LARYNX.

(Lymphatic Vessel Tumours.)

Lymphatic vessels may furnish the source of angiomata.

Statistics.—They are so rare that if the combined statistics of Morell Mackenzie, Fauvel and Jurasz be taken, between 1871 and 1898, we find in 592 cases of benign growths of the larynx, only five lymphangiomata, *i.e.* scarcely 1 per cent.

Jurasz,⁷ in 1898, refers to one single case, that of Koschier, compared with 18 of hæmangiomata.

Suckstorf,⁸² in 1900, mentions three cases, the one recorded by Koschier and two by Prokoffsky.

Horn and Möller¹⁷ (Copenhagen), in 1908, remarked that lymphangioma of the larynx is so rare that the description of only four or five cases can be found in literature.

Angeiomata of the Larynx

New and Clark⁷² (Rochester, Minnesota), in 1919, surveyed the cases of lymphangeiomata and tabulated eight cases.

The present writer (Irwin Moore), in 1920, after a thorough search of the literature, has confirmed these cases and added another reported by Knight, making a total up to date of only nine cases. The case recorded by Milligan has been excluded.

Classification. — Wegner⁸³ (Berlin) differentiates three forms :—

Lymphangeioma Simplex ; or, Capillary Lymphangiectasis.

Lymphangeioma Cavernosum.

Lymphangeioma Cysticum.

The first two, it will be observed, correspond with the parallel varieties of Hæmangeiomata. In the third, the dilations are in places so extreme as to constitute cysts.

Ætiology.—Lymphangeiomata are usually congenital, and appear in early life.

Clinical Appearance.—These growths are generally single, with a smooth or papillary surface,* and of a pale transparent colour. On account of their great rarity and their variations in structure, it is difficult to give a general description of their clinical characters. In one instance the growth was pedunculated (Knight). Whilst Knight described the growth in his case as smooth and whitish in colour, in Richardson's case it was stated to be bluish-grey.

Site.—In three cases the growth was situated on the vocal cords (in two cases being near the anterior commissure). In one case it originated from the ventricle of Morgagni, in another from below the right vocal cord, and in three cases from the aryepiglottic fold and arytenoid.

In Richardson's case the growth was more diffuse, being attached to the ventricular band and ventricular wall, extending as high as the aryepiglottic fold and across to the opposite side. In Milligan's case the growth was probably tracheal in origin and should be classified as such.

RECORDED CASES OF LYMPHANGEIOMATA.

Knight⁸¹ (Mass., U.S.A.), in 1876, described the case of a male, aged 28, who had a pedunculated polypus on the

* "The papillary surface is presumably due to the involvement of the vessels in the papillæ, which leads to an increased prominence of the latter." —(S. G. Shattock.)

anterior part of the left vocal cord near the commissure. It was smooth, whitish in colour, and about the size of a bean. It was successfully removed by forceps. Hoarseness, from which the patient suffered, was relieved.

This tumour was considered to be a lymphangeioma.

Koschier⁸⁵ (Vienna), in 1896, described a very interesting case of lymphangeioma in a male, aged 50, which he assumed was congenital. The tumour was the size of a walnut, and grew from the posterior part of the left aryepiglottic fold and arytenoid cartilage by a broad base. The growth was covered by a red, but otherwise normal, smooth, mucous membrane, and fluctuated. The appearances indicated a cyst, and laryngoscopy rather confirmed this, but the redness was against the diagnosis of a cyst. It was removed by a galvanocautery snare, followed by a flow of milky fluid. Microscopically, it was proved to be a cavernous lymphangeioma, and some parts of it were suspicious of malignancy. It recurred after five months, and extension to the surrounding parts confirmed the sarcomatous nature of the growth.

Prokoffsky⁸⁶ (cited by Suckstorf), in 1900, recorded two cases—

1. A female, aged 55, who had suffered from respiratory trouble for two or three years. A tumour the size of a hazelnut occupied the left ventricle of Morgagni. It was removed in several sittings, and a large quantity of clear fluid evacuated. It proved to be a typical lymphangeioma.

2. A male (age not stated) with a small tumour on the margin of the right vocal cord.

Microscopically, it showed an interstitial tissue, which was a loose connective tissue, with considerable œdema. It also showed elastic fibres.

Fein⁸⁷ (Vienna), in 1902, recorded another example in a male, aged 38. Symptoms had been present for several months. The growth was situated below the right vocal cord. Dark fluid escaped on removal.

Harmer⁸⁸ (Vienna), in 1902, recorded a case from Chiari's Clinic. A female, aged 16. Symptoms had been present ten years. The tumour was situated on the right aryepiglottic fold, and there was another at the base of the tongue.

Menzel⁸⁹ (Vienna), in 1904, described a similar growth also situated on the right aryepiglottic fold. The age and history of the patient was not stated. A complete microscopical description is given along with a section of the tumour.

Angeiomata of the Larynx

Heindl⁹⁰ (quoted by Menzel), in 1904, reported a growth in a male, aged 48, which was situated on the anterior third of the right vocal cord. Some doubt was expressed as to the tumour being a true lymphangeioma.

Milligan,⁹¹ in 1915, exhibited a case at a meeting of the Section of Laryngology, Royal Society of Medicine, and described it as a "subglottic (?) angeioma." Patient was a male, aged 66, who had suffered from slight respiratory obstruction and intermittent attacks of aphonia for five years. A pedunculated growth, arising in the middle line from the anterior tracheal wall, with attachments about a quarter of an inch below the vocal cord, was occasionally seen to swing up between the vocal cords.

It was extremely difficult to say whether the growth originated in the trachea, or just above it.

Microscopically it was shown to be a local lymphangiectasis, with a fibrous capsule, and was about the size of a small marble, *i.e.* just under half an inch in diameter.

Richardson⁹² (Washington), in 1917, recorded at the Thirty-ninth Annual Meeting of the American Laryngological Association another case of lymphangeioma, in a male aged 32, who suffered from considerable dyspnœa and dysphagia. Hoarseness of the voice had existed for ten years. The growth, which completely occluded the vestibule of the larynx, was of a bluish-grey, mottled appearance, smooth and rounded, and felt soft on palpation with a probe. It arose from the right ventricular band and ventricular wall, extending as high as the aryepiglottic fold and across to the opposite side of the larynx. It had been diagnosed as malignant. Since there was no history of hæmorrhage, Richardson doubted that it was a true angeioma, and proved this by puncturing the mass with a laryngeal knife. There was only slight bleeding. Later, he removed the growth by evulsion with a snare. It measured 5 cm. in length, and 2.5 cm. in depth.

Microscopically it consisted of firm fibrous tissue, enclosing extensive cavernous sinuses (lymph spaces), and was covered with stratified epithelium. Small blood-vessels were plentiful in the subepithelial region.

As Richardson points out, this type of growth may be safely dealt with endo-laryngeally, and thyro-fissure is contra-indicated.

Irwin Moore

TRANSITIONAL OR MIXED TYPES OF LYMPHANGEIOMATA.

Clinton Wagner⁹⁶ (New York), in 1881, recorded a very rare case of lymphangio-myxoma of the left ventricle of Morgagni, which was spontaneously expelled during a fit of coughing. The growth was attached by a pedicle to the floor of the ventricle, and was the size of a small pea-nut, slightly pear-shaped and greyish-white, with a jelly-like consistence.

Microscopically it was of myxomatous structure, and had evidently grown in the vicinity of a large varicose submucous lymph vessel, which by bursting had produced an inundation of the tumour with lymph.

Solis Cohen reported this as an angioma in the ventricle.

Grünwald⁵⁴, in 1907, gives a microscopical description of an œdematous lymphangio-fibroma, removed from the left vocal cord of a man, aged 26. (A water-colour drawing of this section is illustrated in Plate XVIII., Fig. 2, p. 112.)

CONCLUSIONS.

Question of Hæmorrhage.

A. *In Unoperated Cases.*—Amongst the total 71 cases recorded, hæmoptysis is only referred to as having occurred spontaneously in 12 cases, and varied from a small amount to profuse severe hæmorrhage, and from a single bleeding to frequent repeated hæmorrhages.

B. *In Operated Cases.*—Amongst the total 73 cases, operative treatment was only definitely stated to have been carried out in 41 cases; so we may conclude that the remainder were not interfered with. Removal by forceps was employed in 19 cases, the cold wire snare in 5 cases, the galvano-cautery in 7 cases, thyro-fissure in 7, suspension laryngoscopy and excision with scissors, 1 case, and radium in 2 cases.

Amongst these 39 cases operated on considerable or severe hæmorrhage occurred in 25 cases, and no hæmorrhage or only slight bleeding occurred in 14 cases.

In the 19 cases in which the tumour was removed by forceps, severe bleeding occurred in 7 cases, slight bleeding in 4, and none in 8 cases.

In the 5 cases in which the tumour was removed by the cold snare, severe bleeding occurred in 2 cases, slight bleeding in 2, and none in 1 case.

Angeiomata of the Larynx

In the 7 cases in which the tumour was removed by the galvano-cautery snare, severe bleeding occurred in 3 cases, slight bleeding in 2 cases, and none in 2 cases.

In the 7 cases of thyro-fissure there was no bleeding, and also in the 2 cases treated by radium.

In the entire series of 73 cases, no death has been recorded from spontaneous hæmorrhage.

Death has occurred in only 3 cases from hæmorrhage, *e.g.* in the case of Ferrari, following the removal of a piece for microscopical examination (see p. 19); in the case of Shurley, during a tracheotomy through cutting into the growth (see p. 24); and in the case of Navratil (cited by Chiari, p. 52), the cause of which is not stated. Chiari, in referring to this case, says the growth was a myxo-angeioma, rich in vessels, and not a true angeioma. Navratil, in the original record of this case, does not refer to the death of the patient.

In Norman Patterson's case (see p. 56), the patient was only saved from death following post-operative hæmorrhage, by an urgent tracheotomy and removal of a large blood-clot which had blocked the bronchi and lower portion of the trachea.

Treatment.

Non-Operative—

1. *Sulpho-Ricinate of Phenol.*—The employment of this preparation has proved successful in the case reported by T. R. Hamilton (see p. 23), and may be of service in some cases.

2. *Application of Radium.*—The satisfactory results in the case recorded by Ryerson (see p. 53), also by New and Clark (see p. 55), should encourage further trial in similar cases.

New and Clark⁷² have employed radium in two of their cases with excellent results, and believe it is specific for all true vascular growths of the larynx, as well as in other parts of the body. They find that mixed or atypical cases, such as fibromata with vascular formation, do not respond so well to radium.

Whilst recommending thyro-fissure in cases of large angeiomata in which the danger of hæmorrhage is great, they consider that the method of choice in other types is suspension laryngoscopy and the insertion of radium against the tumour.

Otto F. Freer⁹⁴ (Chicago) has devised an intra-tracheal radium applicator by means of which a radium emanation tube may be kept in surface contact with a growth in the

Irwin Moore

larynx for prolonged periods: any reflex irritation may be controlled by cocaine.

Operative—

If the tumour is not causing any serious trouble it is best left alone, and in view of the opinion that nasal obstruction may encourage the growth of the tumour, it is recommended that any obstruction or catarrh should be remedied.

If slight hæmorrhage occurs, it may be treated by the application of the galvano-cautery to the bleeding-point.

Endo-laryngeal Route.

The Indirect Method of Removal by Forceps; Cold Snare; Galvano-Cautery Puncture; Galvano-Cautery Snare.—If the tumour causes serious symptoms, such as respiratory obstruction, or if repeated hæmorrhages occur, removal of the mass is indicated, and this may be accomplished by means of endo-laryngeal forceps, the snare, galvano-cautery or thyro-fissure. Hirsch remarks that if the tumour is very small, and has no pedicle, it cannot be removed by the snare or forceps, so the galvano-cautery affords the best means for destroying it. In view of the hæmorrhage which may occur, Vitto-Massei⁵³ recommends that, owing to the risk of hæmorrhage, tracheotomy should precede removal, even by the galvano-cautery. On the other hand, Chiari advises that tracheotomy should only be performed if it is impossible to arrest any accompanying hæmorrhage by other methods.

As shown by the records, hæmorrhage is not usually troublesome in the case of smaller growths, and the excessive hæmorrhage which has occurred in a few cases after endo-laryngeal removal has been easily arrested by endo-laryngeal methods. In a case of severe post-operative bleeding reported by Biaggi it was controlled by gelatin enemata.

Rille⁹⁵ (Insbrück) recommends the following gelatin injections :—

Gelatin Alba	.	.	.	.	.	3·0
Dissolved in Distilled Water	.	.	.	.	.	300·0
Sodium Chloride	.	.	.	.	.	1·50
Sterilise for a quarter of an hour.						

Still the fact remains that the danger of endo-laryngeal removal by forceps, snare, or galvano-cautery must be considered from the point of view of the risk of exposing the

Angeiomata of the Larynx

patient to hæmorrhage, difficult to arrest (in some cases) endo-laryngeally, the possibility of severe laryngeal spasm, and of the entrance of blood into the bronchi. The risk is well shown by the cases of Ferrari (see p. 19) and Norman Patterson (see p. 56).

The Direct Peroral Method of Removal—

(a) *By Means of Laryngeal Tube Spatulæ.*—This method is to be recommended, since, if bleeding occurs, the endoscopic tube may be employed as an intubation tube and an intra-tracheal suction tube, attached to Kelly's apparatus, passed down the endoscopic tube. By this means any blood which may enter the respiratory passages can be immediately removed, and the necessity of an urgent tracheotomy avoided.

(b) *By Means of the Suspension Apparatus.*—Experience has shown the ease with which growths of the epiglottis and aryepiglottic folds may be removed by this procedure, and this method is admirably adapted for the removal of angeiomatous tumours, especially those situated in the aryepiglottic region. A preliminary laryngotomy or tracheotomy should always first be performed, in order to avoid the risk of an urgent operation when a hæmorrhage has occurred, and the life of the patient is in danger.

Clyde Lynch⁹⁶ (New Orleans), during the discussion on the case reported by Emil Mayer, suggested the use of the suspension apparatus in those cases in which it was possible to get underneath and around the place of attachment of the tumours, and especially if the surface is not too broad.

The case recorded by Norman Patterson and Pike⁷¹ occurred after completion of this monograph, and it is interesting to note that consequent on their experience in this case, they recommend preliminary tracheotomy. This opinion coincides with the conclusion arrived at by the writer after a careful study of all the recorded cases. It is remarkable, considering the great rarity of these tumours, that following an interval of fourteen years two cases should be brought to the notice of the Section of Laryngology, Royal Society of Medicine, within a year of each other.

Though the results of endo-laryngeal treatment have been satisfactory in many cases, it is as a rule much safer, if operative interference is indicated, to perform a thyro-fissure.

Irwin Moore

Extra-Laryngeal Route.

Thyro-fissure.—Since the occurrence of hæmorrhage in the removal of the growth is due to opening into the cavernous spaces, this can be avoided in the non-pedunculated forms affecting the ventricular bands or vocal cords by the performance of thyro-fissure, which offers a direct and open view, and the advantages that a wide sweep can be made through healthy and normal tissue round the growth, just as in the case of intrinsic malignant disease. In this way bleeding is practically nil, owing to contraction of the normal and healthy blood-vessels, and any hæmorrhage which does occur can be easily controlled. Improvements during recent years in the technique of the operation have done away with the risk of opening the larynx.

Toubert, Edmund Meyer, Emil Mayer and others advocate removal by thyro-fissure on the grounds of the risk of hæmorrhage.

Emil Mayer has performed this operation under local anæsthesia in one case, in which a wide and thorough excision of the tumour was carried out, with only slight bleeding, the cut surface of the mucous membrane being afterwards reunited by its edges with sutures, thus restoring the continuity of the mucous membrane.

Hamilton White remarks that the satisfactory results of thyro-fissure lead one to believe that this operation should be undertaken, and the more so since the risks of endo-laryngeal operations have been shown to be so uncertain.

Richardson has pointed out the importance of angeioma cavernosum being differentiated from lympho-angioma, since the latter may be safely dealt with endo-laryngeally, and does not require in any case thyro-fissure.

I am much indebted to Professor S. G. Shattock for his kind assistance in revising those portions of the paper dealing with Classification and Histology.

By an interesting coincidence, G. B. New and C. M. Clark (Rochester, Minnesota) were also writing a conjoint paper on "Angeiomata of the Larynx" concurrently with the present writer. Their paper, published in the *Annals of Otology, Rhinology, and Laryngology*, in December 1919, was unknown to the present writer until after he had completed his paper.

Angeiomata of the Larynx

The three new cases which they have reported from the Mayo Clinic have been included in this paper, together with a few additional remarks.

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DESCRIPTION OF PLATES.

FIG. 1.—Microscopical Section of an Angioma Cavernosum of the Left Pyriform Fossa and Aryepiglottic Fold.

A. Surface Epithelium; B. Mucous Glands; C. Fibrous Tissue; D. Blood Clot in Cavernous Spaces. $\times 35$. (Norman Patterson's and Mr Pike's Case.)
(Specially drawn for the author from a section prepared by Hubert M. Turnbull, Pathological Institute, London Hospital. By kind permission.)

FIG. 2.—An Angioma of the Right Pyriform Fossa. (Morell Mackenzie's Case.)
Re-drawn from his book.

FIG. 3.—A Tumour at the edge of the Right Vocal Cord, at the junction of its anterior and middle thirds. (Solis-Cohen.) *Re-drawn from his article.*

FIG. 4.—A Rounded Tumour on the upper surface of the Left Vocal Cord, at the junction of its anterior and middle thirds. (Percy Kidd's Case.) *By kind permission.*

FIG. 5.—A large Raspberry Tumour upon the surface and edge of the Right Ventricular Band, along with a similar, but smaller, growth on the anterior extremity of the Left Vocal Cord. (Norris Wolfenden's Case.) *Re-drawn from his article.*

FIG. 6.—A Nodular Tumour, situated on the middle of the Right Vocal Cord. (Jurasz's Case.) *Re-drawn from his article.*

FIG. 7.—A Tumour of a Teleangiectatic character, involving the Right Vallecule and Right Aryepiglottic Fold, both Ventricular Bands and the left Subglottic Region. *Re-drawn from a coloured illustration in St Clair Thomson's "Diseases of the Nose and Throat"; 2nd Edition, 1916, Plate xvi. fig. 5. By kind permission.*

FIG. 8.—A dense round Tumour, projecting from the middle of the inter-arytenoid region into the lumen of the Larynx. (Grünwald.) *Re-drawn from a coloured illustration in Grünwald's "Atlas der Kehlkopfkrankheiten"; 2nd Edition, 1907, Plate xviii. fig. 1.*

FIG. 9.—A Tumour involving the whole Right Vocal Cord and Ventricular Band, and another present on the anterior third of the Left Vocal Cord, including the Ventricular opening. (Hirsch's Case.) *Re-drawn from his article.*

Angeiomata of the Larynx

FIG. 10.—A Pedunculated Tumour, attached by a leaf-like pedicle to the margin of the anterior two-thirds of the Left Vocal Cord. (Horn and Möller's Case.) *Re-drawn from their article.*

FIG. 11.—A Tumour the size of a broad bean in the inter-arytenoid region, with another Tumour occupying the margin of the Right Ventricular Band. (Hamilton White's Case.) *Re-drawn from his article.*

FIG. 12.—A Diffuse Tumour originating from the Left Ventricular Band, and along the external margin of the Left Vocal Cord. Another Tumour on the anterior surface of the Right Arytenoid, and extending beyond it. (Ryerson's Case.) *Re-drawn from his article.*

FIG. 13.—A Tumour growing from the Left Ventricular Band, covering the True Vocal Cord in its posterior half, and extending into the Ventricle on that side. (Emil Mayer's Case.) *Re-drawn from his article.*

FIG. 14.—Angeioma Cavernosum of the Left Pyriform Fossa and Aryepiglottic Fold.
A. The Tumour viewed from the free surface, with the normal Mucous Membrane divided round it. *B.* and *C.* Blood Casts from the bronchi, resulting from post-operative hæmorrhage, which were extracted from the tracheotomy wound. (Natural size.) (Mr Norman Patterson's and Dr Pike's Case.) *By kind permission.*

FIG. 15.—A Blood Cyst at the angle of the Vocal Cords. An atypical case for comparison. (George Johnson's Case.) *Re-drawn from his article.*

The Author is indebted to Mr Thornton Shiells for the drawings which illustrate the paper.

HEAD-NYSTAGMUS IN HUMAN BEINGS.

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FROM the classical experiments on pigeons it will be remembered that vestibular irritation in these birds particularly manifested itself in definite rhythmical movements of the head, the so-called head-nystagmus. Movements of the eyes are also to be found, but less pronounced and noticeable than those of the head.

It is otherwise in human beings; here a head-nystagmus is of the greatest rarity. Mammalian animals occupy a middle position, head-nystagmus being found in rabbits and guinea-pigs, whilst it is absent in dogs, cats, and apes. E. Urbantschitsch, to whom we owe the above information, is of the opinion that the appearance of head-nystagmus depends upon the animals in question being adapted to monocular vision. Very circumscribed ocular movements are associated with monocular vision, fixation being principally performed by means of movements of the head. With binocular vision the movement of the eyes is much more free and is the principal means of fixation. Consequently, head-nystagmus ought to be especially distinct in birds, whose eyes turn each to its side with different fields of view. That head-nystagmus also appears in guinea-pigs, whose eyes look forward, is explained by Urbantschitsch by the circumstance that this animal cannot fix binocularly. This he considers proved because he was unable in guinea-pigs, and indeed also in rabbits, to produce any optical eye-nystagmus when he placed them in the middle of a revolving cylinder, the inner sides of which were covered with alternating black and white stripes. On the other hand, he could produce optical eye-nystagmus in cats, dogs, and apes, that is to say in animals in which no vestibular head-nystagmus can be produced. The experiments are impeded by the necessity of fastening the animals, thus causing counter movements. It does not, however, appear to me that this proves either that optical eye-nystagmus is dependent upon binocular vision, or that vestibular head-nystagmus is a consequence of the monocular vision.

There exists in literature some few observations of head-

Head-Nystagmus in Human Beings

nystagmus in human beings. E. Urbantschitsch has observed in two patients suffering from labyrinth fistula that when the fistula was directly touched or compression applied (fistula test), not only did the usual optic movements appear (fistula symptom) but also a head-nystagmus corresponding exactly to them. In one case such movements of the head also appeared spontaneously. Ruttin has in like manner observed head-nystagmus in fistula tests in one patient suffering from labyrinth fistula. Further, Bárány and Neumann have seen head-nystagmus in a patient suffering from traumatic neurosis and giddiness, pronounced shaking of the head appearing after rotation. Further, Alexander, whose work includes observations on the vestibular reaction after rotation in 132 new-born infants, remarks *en passant* that one infant exhibited head-nystagmus after rotation to the one side but not to the other. Alexander has, however, seen two other cases of head-nystagmus in infants. Bárány, who recently investigated the vestibular reaction in infants, does not even mention head-nystagmus. Gatscher has examined one series of children aged six months, and another between one and two years. The first series consisted of twenty-three children and contained two cases of head-nystagmus. The phenomenon in one of them was only slight. In the second series head-nystagmus was also found twice. As Gatscher has not examined just that age class in which the reaction is typical, he has, however, failed to show that head-nystagmus is quite a normal vestibular reaction in human beings.

I have had the opportunity of examining fifty new-born infants in the lying-in hospital of Copenhagen. In these I found, as a rule, in accordance with former investigators (Bartels, Alexander, and Bárány), very distinct reactions of the head during and after rotation, which took the form of a turning of the head to the same side as the slow vestibular phase. In eight of these infants, all full-time, the head movements after rotation exhibited certain irregularities. Two of them after rotation in the horizontal plane made shaking or rocking movements of the head from side to side, but these movements did not resemble a nystagmus; one of these two children exhibited corresponding movements backwards and forwards after rotation in a sagittal plane (accompanying a vertical nystagmus). The same was the case with four other children, whose reaction after rotating in a horizontal plane did not exhibit any abnormality. In several of these cases it

S. H. Mygind

seemed as though there was a struggle between the force of gravity and the vestibular muscular innervation endeavouring to keep the head in position so that by degrees, as the muscles became weary, the head fell downwards after a couple of vain jerks. The movements were therefore slow, not in time with the movements of the eyes and often quite irregular. In only two infants did I observe anything like a head-nystagmus. In one case traces of head-nystagmus were recorded a single time after rotation in the sagittal plane (accompanying a vertical nystagmus). In the other case after rotation to the left (but not to the right), both in the horizontal and frontal planes, nystagmus jerks of the head to the right were observed, corresponding respectively to the horizontal and rotatory nystagmus to the same side. I do not consider myself justified from these few and uncertain observations in declaring that head-nystagmus appears in new-born infants.

Nevertheless head-nystagmus in human beings is a normal vestibular reflex. This is shown by investigations I have made on somewhat older infants. These investigations comprise altogether thirty individuals between ten days and two years old. These children were, in many cases, not so developed as is normal at their respective ages, as nearly all of them were patients or at all events convalescents. The diseases they suffered from were partly the usual infantile troubles, partly congenital syphilis; a couple of them had acute middle-ear suppuration. All the children were rotated in the horizontal plane, most of them also in the frontal and sagittal. Their respective horizontal, rotatory, and vertical nystagmus, and also the movements of their heads, were observed. As usual ten rotations were made in about eighteen seconds with instantaneous stoppage.

No head-nystagmus was observed corresponding to the vertical and rotatory eye movements. This weakens the supposition that the rocking movements observed in new-born infants, accompanying vertical eye-nystagmus, has anything to do with head-nystagmus. On the other hand, a head-nystagmus to the same side as the horizontal eye-nystagmus was observed in no less than twenty of the children after rotating them in the horizontal plane; in two cases, however, the reaction was so feeble that it was described as dubious. In several of the others the reaction was but slightly pronounced, so that it could easily have been overlooked. On the other

Head-Nystagmus in Human Beings

hand, in several of the children the movements were as pronounced as those one meets with in rabbits, a quick and decided toss of the head appearing to the same side and synchronously with each quick phase of the eye-nystagmus, followed like the eye movements by a slow movement to the opposite side. All the movements were in the horizontal plane. The quick phase was the most marked, the result on the whole being that the head was held more to the side towards which the nystagmus pointed. In the distinct cases the head- and eye-nystagmus lasted an equal length of time, but in other cases the head-nystagmus did not last as long as the eye movements, or was confined to a few jerks immediately after the stoppage of rotation. As a rule head-nystagmus is strongest after the stoppage (after nystagmus), but it may sometimes be seen at the commencement of rotation; it then has, naturally, the opposite direction to the reaction on stoppage. Sometimes in the same individual a distinct head-nystagmus was seen on one occasion, while at the next it was absent. Sometimes one may find, especially in the youngest individuals, a head-nystagmus on one occasion corresponding to the rapid phase of eye-nystagmus, and on the next a turn of the head to the opposite side corresponding to the slow eye phase.

Head-nystagmus would seem to appear in a certain age class. I have found it earliest in infants a month old, excepting in the above-mentioned dubious cases of new-born infants. The oldest child was aged $1\frac{1}{4}$ years, but this case was somewhat dubious. Twenty-three children were examined between the ages of one and eight months and head-nystagmus was found in eighteen of these, *i.e.*, 78 per cent. Of five of these cases where no head-nystagmus was observed, two were very feeble and a third was only one month old. It seems that the stronger the child the more distinct the head-nystagmus, which naturally requires a certain muscular power. That the reaction is attached to a certain age class is probably explained by the circumstance that the necessary nerve tracts are first myelinised at this time.

But why does head-nystagmus disappear later on? Why is it that we only find a vestibular action on the muscles of the neck in animals? One can hardly imagine that nerve-tracts, once established, subsequently disappear. It is more reasonable to suppose that a vestibular tonisation of the muscles of the neck constantly takes place, but is not strong enough to produce

S. H. Mygind

a visible effect because certain other nervous influences of later origin have a counter action.

Fixation must naturally act as a brake upon vestibular head-nystagmus, just as it restrains the vestibular eye-nystagmus. But even if one omits fixation of vision by closing or covering the eyes, there may be a quite unconscious tendency to fixation in the form of a constant endeavour to keep the head in the normal middle position, a reflex which has its source in the proprioceptive nerve tracts and is probably formed in the cerebellum. This theory is not a mere supposition, indeed it can hardly be said to be anything new. Such a reflex would seem to be the essential foundation for Babinski's *cataplexis cérébelleuse*, in which the part of the body in question is unable to return to its normal position. It would therefore seem to be this reflex fixation of the head which hinders the vestibular reaction and prevents it becoming visible.

How are we to explain the head-nystagmus which under some pathological conditions appears in adults? Of the four cases mentioned in literature, three exhibited labyrinth fistula. This can scarcely be accidental. When testing for the fistula symptom one produces the strongest movement of the endolymph, and therefore the most violent vestibular irritation which we are able to set up. This circumstance, however important, cannot alone explain the appearance of the phenomenon, for in that case a greater number of patients suffering from labyrinth fistula would exhibit head-nystagmus.

A closer analysis of Urbantschitsch's cases (Ruttin's reports are very summary and give no information beyond the otological examination) shows that all his patients were probably hysterical. Urbantschitsch himself says of the first case that hysteria could neither be proved nor excluded. There were, however, increased reflexes and slight hemianæsthesia; also attacks of unrest and terror. In the case of the second patient with labyrinth fistula, horizontal and sometimes vertical nodding movements of the head appeared, not only after compression-aspiration in the external auditory meatus, but also quite spontaneously. These spontaneous movements were not accompanied by movements of the head, which must give suspicions of a functional disturbance. The fistula test produced in this case very violent giddiness and malaise, which are comparatively seldom met with in cases of organic labyrinthine disease. Blowing air into the healthy ear, or the application of cold upon the healthy side

Head-Nystagmus in Human Beings

of the face, increased the tremor of the head. The third patient suffered from traumatic neurosis.

I believe that these patients, on account of their hysteria, were over-sensitive to the vestibular influence upon the neck muscles—an influence which is also found in normal persons as a slight tonisation, but so feeble that we do not feel it. The reason that these hysterical patients are able to produce a head-nystagmus, can hardly be that they are able to eliminate the restraining innervation usually present in adults. The process which occasions the movements is hardly the same as in children. It seems more probable that it is a question of voluntary giving way to the vestibular impulse, a kind of exaggeration. For this reason also the patients easily make too much out of the reaction. In one of the cases movements, apparently without reason, appeared in an up and downward direction, and the patient, so to speak, fell out of his part, being able to produce head-nystagmus quite spontaneously without any influence being brought to act upon the fistula, and also without the accompaniment of eye movements. It is, of course, always somewhat daring to formulate a diagnosis based only upon published case records, but the attempt has in this instance been specially tempting, because it provided the only means by which one could explain the appearance of head-nystagmus in adults.

As we have seen that head-nystagmus may appear as a quite physiological vestibular reaction in human beings—even if only in a limited age class—there is hardly any reason for us to set up a connection between this phenomenon and the “monocular *contra* binocular” system of vision as has been suggested by Urbantschitsch. It seems to me also very doubtful whether optical nystagmus has anything to do with the individual in question fixating monocularly or binocularly. The fact that ocular nystagmus is produced with difficulty in dogs and cats and not at all in rabbits and guinea-pigs by the usual experiments with the rotating cylinder, can be explained by supposing that the attention of the animals is diverted because they are fastened up, or because they are occupied by the experimenter and his movements, or by the noise made by the apparatus, or because they are paralysed by the whole situation. Finally, we must remember that a certain degree of intelligence is required in order that the animal's eye may be caught by anything so indifferent as the passing

S. H. Mygind

of black and white stripes. From this point of view we can understand that optical nystagmus does not appear in rabbits and guinea-pigs in contradistinction to the better gifted dogs and cats. Even in the case of the latter the result does not seem to be absolutely satisfactory. In children a preliminary examination proved that it was easier to produce optic nystagmus in the somewhat older children ($1\frac{1}{2}$ years) than in the younger, who either do not look at the rotating cylinder at all or are occupied by quite other things; such children have apparently no optical eye-nystagmus, although they fix binocularly quite well.

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CRITICAL REVIEW

IMMUNITY IN HEALTH: THE FUNCTION OF THE SUBEPITHELIAL LYMPHATIC GLANDS

By A. LOGAN TURNER, M.D.

IMMUNITY, or the non-susceptibility of the individual to a given disease or organism, or to its toxins, may exist under natural conditions, the tissues being physiologically capable of dealing with the poison; or, it may be acquired after the individual has passed through an attack of the disease, or has been made the subject of artificial inoculation. Amongst the anti-bacterial agencies designed to maintain the state of natural immunity, there must be placed the phagocytic activity of the leucocytes and the action of the normal blood serum.

The writer's interest has been attracted to the subject by the perusal of Kenelm Digby's recent Monograph on *Immunity in Health*, (1919¹). This review is a short analysis of the subject-matter of the volume. The author groups under the term, the subepithelial lymphatic glands, the various areas of lymphoid tissue in the wall of the alimentary canal, and he seeks to unify their immunising function in the bodily economy.

Various hypotheses have been advanced, from time to time, regarding the function of the lymphatic tissue at the upper end of the alimentary canal. Mention may be made of its use in the production of lymphocytes from the germinal centres of the lymphoid follicles (hæmopoietic theory); of its function as a protection to the body through the phagocytic action of the young polynuclear leucocytes (Lovell Gulland); and its use as a means of elimination during the common acute infections, the inflammation of the tonsils in such infections being a secondary and not a primary phenomenon. Digby supports the view that the tonsils provide protection by being immunising or auto-vaccinating stations of the body. The faucial tonsils, like the appendix and other structures in the human body, have been regarded also as useless and even dangerous relics of a past usefulness, vestigial organs which have not yet been eliminated by the process of natural selection. But with increasing physiological knowledge the number of these structures grow gradually less, and the tonsils and appendix can no longer be regarded as representatives of persistent foetal structures, like Meckel's diverticulum or the atrophied muscles of the external ear, which have ceased to be of any service to man. Furthermore, a study of comparative anatomy discloses the fact that the subepithelial lymph nodes occur almost exclusively in the two

A. Logan Turner

highest classes of animals—the birds and mammalia—while embryology brings to light the additional fact that the lymphatic nodes appear in the later stages of the development of the embryo.

In the alimentary canal the subepithelial lymphatic tissue is distributed in a series of well-known groups, the chief of which are the faucial and lingual tonsils and pharyngeal lymphatic nodes, the aggregated lymph follicles (Peyer's patches) and the solitary nodes of the small intestine, the lymphatic tissue of the vermiform appendix and the solitary lymph nodes of the large intestine. It is significant that the lymphatic tissue is found where bacterial activities are greatest, in such dangerous zones as the fauces, the ileum, and the cæcum. In the œsophagus, the bolus does not remain long in contact with the walls of the tube: in the stomach, the secretions destroy the bacteria, and it is not until the lower end of the ileum is reached and the longer incubation period increases the number and activity of the organisms, that the frontier is more actively threatened. Although the lymphatic tissue is distributed in patches, it is by no means insignificant in amount, and its arrangement is such as to bring the cells into close contact with the collections of bacteria contained in the mucus of the canal. In a Peyer's patch there is an aggregation of from 10 to 60 lymph nodules (Sobotta). Lockwood has estimated that in the lining membrane of the human appendix there are as many as 150 to 200 lymphoid nodules, while, in the faucial tonsils of man, the irregularity of the covering epithelial surface permits of a large collection of lymphatic nodules in a comparatively small space.

Each lymph nodule is the unit which in the aggregate constitutes the subepithelial gland; within the meshwork of each nodule lie the large and the small glandular lymphocytes endowed with phagocytic activity. In contra-distinction to the interstitial lymphatic glands, those of the subepithelial variety possess no afferent lymphatic vessels, but lying close to the epithelial covering of the alimentary canal, the cells pass readily into its lumen and return again to the interior of the gland. The emigration of the leucocytes was first demonstrated as a normal occurrence by Stöhr (1883).

The ingestion of bacteria by the wandering cells is a phenomenon of the greatest importance in the defence of the organism. The observations of Ribbert and Bizozzero (1885) and those of Armand Ruffer (1890²) demonstrated successfully the presence of bacteria in the lymph nodes of the tonsils and Peyer's patches and in the lymphatic tissue of the appendix of rabbits and other animals. Observations made both before and since these dates have shown the leucocytes in the mucus on the surface of the tonsils to be full of microbes, while between the surface epithelial cells similar bacilli-

Immunity in Health

laden cells are in process of returning to the interior of the lymph nodule. The researches of Metchnikoff have shown that the phagocytic activity of the cells which bring about the ingestion of the organisms is only the first stage in the production of natural immunity, their intracellular destruction through the bactericidal action of the normal serum being the second stage in the process and one of equal importance.

Thus the different groups of glands in the series show similarity of structure and function. Comparative anatomy furnishes evidence that the faucial, ileal, and cæcal groups are represented in most, if not all, of the higher animals. Seccombe Hett (1913³) has demonstrated that the majority of mammals possess tonsils, either as protuberant masses of lymphoid tissue, or as blind tubes or recesses lined by the same tissue and opening into the throat. Huntington's work (1903) shows the solitary and aggregate follicles in mammals and the solitary follicles in birds, while Berry (1901) has proved that the apex of the cæcum contains lymphoid tissue in its walls in almost all of the mammalia.

While comparative anatomy bears testimony to the greater development of the lymphatic tissue in the higher forms of life, a fact which testifies to its usefulness, the history of the glands both before and after birth provides additional evidence that they may have a common function to perform. Embryological study furnishes proof that the lymphoid follicles of the human tonsil do not appear until the last month of foetal life, and Berry makes the statement that in the cæcal region of mammals the lymphoid tissue is almost entirely a post-natal development. Digby's observations on the appendices of rabbits bring to light the fact that the lymphatic tissue develops rapidly in the first few weeks after birth. It might indeed be adduced from these statements that the stimulus of bacteria in the alimentary canal, consequent upon the commencement of the ingestion of food, was capable of provoking the development of the tissue. When we come to study their further post-natal history we see that during the early years of childhood the glands attain their maximum development and apparently are then most active. It is the period when the individual is acquiring immunity against the exanthemata and other infections, and the correlation of these two phenomena, activity and hyperplasia on the one hand and immunity on the other, is not without significance. At or about the time of puberty a diminution in the size of the glands takes place, and in later years, when presumably a high degree of immunity has been attained, they undergo a partial decrease. Finally, in advanced age, through a process of atrophy or inflammatory fibrosis, a further shrinkage occurs.

Thus, briefly stated, are the anatomical and physiological data laid down in support of the thesis that the various groups of subepithelial lymphatic glands found in the alimentary canal are concerned in the

A. Logan Turner

production of natural immunity. What further information may be derived by studying their behaviour in disease or by noting the similarity of the diseases to which these glands are liable? The lymphatic tissue bears the brunt of the attack in faucial and intestinal affections. In all the glandular groups it is liable to attacks of inflammation, while the initial lesion in almost every instance is an inflammation of the lymphatic nodes and not an ulceration of the mucous membrane. Lymphadenitis is the starting point in an attack of appendicitis just as it is in cases of tonsillitis, while the adenitis of a Peyer's patch precedes the ulcer in enteric fever.

Inflammatory changes in the lymphoid tissue are developed in the early stages of such diseases as the exanthemata, rheumatic fever, acute anterior poliomyelitis, typhoid fever, infantile enteritis, and acute appendicitis. Occasionally, during scarlatinal epidemics, an individual appears to secure immunity by a mild attack of tonsillitis, unaccompanied by rash or constitutional symptoms, while a similar immunity may be obtained in epidemic cerebro-spinal meningitis. Many "contact cases" which have never suffered from an attack of infectious disease may carry the virulent organisms in the throat and alimentary canal with apparent impunity. The "healthy carriers" constitute a difficult problem for the Medical Officer of Health. It might be rightly surmised that their immunity was the result of mild infections of the blood stream, but examination of the blood in some of these cases has revealed no evidence of agglutinins, such as may be disclosed in the blood of those convalescing from an actual attack. The immune carriers may outnumber the cases of disease as in cerebro-spinal meningitis, and it may be justifiable to assume that the immunity may have been acquired through the action of the subepithelial lymphatic glands without invasion of the blood stream.

On the other hand, when the reaction of these glands to infection is slight or absent, it is significant either of a lowered resistance or of a very virulent type of infection and may presage a fulminating or even a fatal attack. It is reasonable to suppose that these glands share in the production of a lymphocytosis as a defensive measure, such a reaction being more easily provoked in early life when the activity of the lymphatic tissue in children is greater.

Chronic enlargement of the subepithelial lymphatic glands is a common affection in early life and manifests itself as a hyperplasia of the lymphoid nodules, in all probability as a protective reaction against recurring infection. In the fauces and pharynx this is frequently demonstrable, and in some children from whom the tonsils have been excised we have observed, at a later period, very considerable hypertrophy of the lateral bands in the pharynx. Hypertrophy of

Immunity in Health

Peyer's patches has been noted repeatedly at autopsies on children. The absence of a standard renders it impossible to estimate the normal or hypernormal amount of lymphatic tissue in the wall of the vermiform appendix.

If the anatomical, physiological, and clinical data bearing upon the community of function of the different groups of subepithelial lymphatic glands in the alimentary canal are to be regarded as providing sufficient evidence of their usefulness in the human organism by assisting in conferring a natural immunity, what is to be the attitude of the surgeon in relation to his treatment of these structures? Digby admits that the absence of direct evidence is the weakest point in the case as he presents it. He suggests a series of experiments which would provide almost conclusive proof of the thesis. The appendix of the rabbit might be sutured to an opening in the abdominal wall, and in the same way a loop of jejunum devoid of Peyer's patches might be isolated, opened and stitched to the skin. Various types of pathogenic bacteria could then be introduced through the two fistulæ and careful observations carried out. Could a stronger dose be inserted into the appendicular than into the jejunal sinus without producing harmful effects, and might a higher degree of immunity be conferred more rapidly by injection into the appendicular than into the jejunal opening? The complete acceptance of the thesis should lead to a more conservative line of action, and it might stimulate further attempts at securing an increased immunity by the administration of bacterial cultures *per oram*.

To the laryngologist, however, the main interest of the subject is centred in his attitude towards the treatment of the faucial tonsils. Is the surgeon's position made easier by accepting the theory now put forward? Much has been written on the vexed question of a too frequent and sometimes unnecessary removal of these organs, and the problem has been widely and repeatedly discussed. It is somewhat outside the purpose of this review to open a discussion upon the question, although to do so would be a natural corollary to what has been stated in the foregoing sections. The opinion is expressed, however, by some writers that there is too great a tendency to remove the faucial tonsils at the same time as the nasopharyngeal adenoids are being curetted, without due consideration as to the actual necessity of doing so. School inspection has led to an enormous increase in the number of cases of tonsillectomy, as the statistics of the Ear and Throat Departments, upon which may still fall the burden of carrying out the wishes of the School Medical Officers, bear testimony to. Is the removal of the tonsils in all these cases quite justifiable; may there not be a tendency to make tonsillectomy somewhat a matter of routine procedure? An occasional attack of tonsillitis in a child may

A. Logan Turner

be a cheap ransom to pay for immunity from general infections of greater frequency and severity.

Unfortunately, the tonsils may become so large as the result of their successful response to infection, as to cause actual mechanical disability; or, again, as a consequence of such attacks, they may become the seat of local sepsis and the portals of entry of systemic disease. The recognition of the liability of the tonsil to succumb to successful bacterial invasion and to create in itself foci of danger, increases the difficulties of the surgeon. He may find himself, sometimes, between the upper and the nether millstones. He sees, on the one hand, the child with recurring attacks of tonsillitis, and he is conscious of the fact that if he removes the tonsils he may deprive the child of structures which are physiologically useful even when inflamed. On the other hand, he is also aware that at any time the tonsils may be overcome by a more virulent infection, which may lead to results of a serious nature.

His inclination to accept the theory might be strengthened if a careful scientific investigation could prove that a greater tendency to disabilities existed amongst children from whom the tonsils had been removed, than in those on whom no operation had been performed. Digby suggests the observation of many thousands of children living under similar conditions, in one half of whom the tonsils had been enucleated and the adenoids had been removed within the first three or four years of life, and a comparison made with the other half as to the susceptibility of the two groups to infectious disease during the remaining years of childhood. Such an investigation might be valuable, but it is fraught with many difficulties.

Observations on a smaller scale than that suggested have been carried out. Crowe, Watkins, and Rotholz, of the Johns Hopkins Hospital (1917⁴), have published the after-histories of a number of cases of tonsillectomy. They observed in patients whose tonsils and adenoids had been removed, an enlargement of the cervical glands, a recurrence of arthritic symptoms, repeated attacks of rheumatic fever and, especially frequently, a recurrence of chorea after a mild coryza or pharyngitis. Zahorsky (1919⁵) has published some late results following the removal of the same structures in 150 children observed from six months to five years after operation. He writes: "The clinical impression that tonsillectomy increases the tendency to bronchial and pulmonary infection is corroborated by my figures although they are not conclusive, as no statistics are available as to the usual incidence of acute broncho-pneumonia in children. That an attack of acute tonsillitis renders the child temporarily immune to a variety of dangerous infections seems probable. My observation shows that the child beginning his school life without the tonsils is in greater

Immunity in Health

danger of acute diseases than one who still has them." Can most of us not recall cases where we have removed the tonsils *because* the child was leaving home and about to start his or her school life, the avowed object being to lessen the risk of infection!

The answer to the question, are the tonsils a protection or a menace, must be in the affirmative as regards both counts. A number of phenomena support the contention that a large ingestion of bacteria is continually going on through the subepithelial lymphatic glands, possibly accompanied by an immunisation of the body against their invasion. There is considerable clinical evidence, too, that the tonsils may become the seat of local mischief and constitute one of the portals of entry of systemic infection. It should be the duty of the surgeon, therefore, to exercise his judgment in considering the case of each child brought before him, and to work, whenever possible, in active co-operation with the physician who is acquainted with all the circumstances of the case, and who could provide a reliable clinical history. If this could be more efficiently carried out, the number of operations on the tonsils would probably be fewer. In the case of the adult, the position of the surgeon is not so difficult: the period of the greater functional activity of the tonsil is past, and the evidence of focal disease is usually more apparent. Consequently, the proper action to take is more obvious.

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SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY.

March 21, 1919.

President—Mr HUGH E. JONES.

ABRIDGED REPORT.

Demonstration on a New Theory of Hearing. By Sir THOMAS WRIGHTSON, Bt., and Professor ARTHUR KEITH, M.D., F.R.S.

Professor KEITH.—The theory is Sir Thomas Wrightson's and was outlined in an address given to the Cleveland Institution of Engineers in 1876, but it was quite overshadowed by the glamour attached to the theory and name of Helmholtz. According to the Helmholtzian theory the internal ear is a sort of microscopic piano, furnished with resonating strings, some 16,000 in number. Each string or set of strings is supposed to pass into a state of vibration when its sympathetic note enters the ear. Each string is supposed to have a corresponding nerve-fibre leading ultimately to a central nerve-cell station or exchange, where 16,000 nerve-cells receive messages from their corresponding ear strings. Helmholtz's theory, from the point of view of a psychologist, physiologist, or an anatomist, is an impossibility. The strings are there but they cannot vibrate individually. In Sir Thomas Wrightson's theory the ear acts as a single machine; it is the most minute and most delicately adjusted spring balance ever invented—one designed not only to weigh the simplest and slightest sound-wave but also the most complex and voluminous. Through the hair-cells or semaphores, messages or semaphoric signals are transmitted from the ear and may be compared to the dot-and-dash system of the Morse code; the whole of the organ of Corti is involved in the production of this code of signals; all the fibres of the auditory nerve are concerned in its transmission from the ear to the brain. It is a legitimate inference to suppose that the time signals can be deciphered and sorted out at nerve synapses in the central nervous system. Thus, Sir Thomas Wrightson's theory brings hearing into line with smell, taste, sight, and touch. Helmholtz's theory, on the other hand, breaks the most elementary law we know regarding the nature of nerve constitution. The ear has been evolved from the balancing apparatus

of the primitive labyrinth. In the lowest fishes a closed vesicle on each side of the head, filled with fluid, serves as the central part of the labyrinth; on its floor is a nest or island of hair-cells. On the hairs is balanced an otolith; nerve fibrils commence in or round the hair-cells. So long as a fish swims on an even keel the ciliary semaphoric system is at rest; but if it heels over, then gravity comes into play; the otolith as it answers to gravity bends the hairlets right or left, and sets up certain changes in the living cells which are transmitted as signals along the attached nerves. In this apparatus there are four elements: (1) the otolith or titillator; (2) the hairlet or lever on which the titillator acts; (3) the sense-cell on which the lever acts; (4) the nerve-fibres which are stimulated. In the semi-circular canals we find the same four elements. Bárány showed that movement of the fluid in one direction gave one set of signals, in a reversed direction another set. With the evolution of the cochlea, the same four

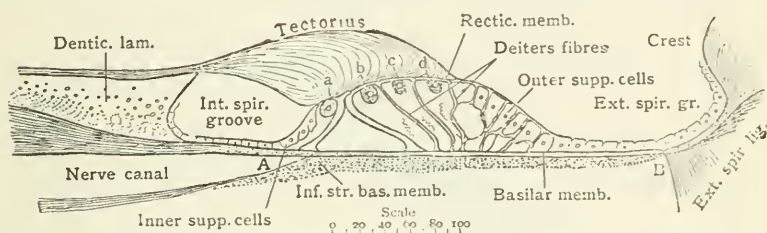


FIG. 1.—Diagrammatic section through the organ of Corti. *a, b, c, d*, Cilia in the zero position. The scale is in microns.

elements were used (Fig. 1). The titillator is the tectorial membrane; the hairlets are levers and the sense-cells and nerves are as before, save that the sense-cells are now set in an elastic scaffolding of fine elastic rods and fibres. But one novel change has been introduced: in the balancing apparatus of the vestibule the sense-cells are fixed; the titillator is movable. In the cochlea Nature has reversed the arrangement and set the sense-cells on a movable membrane—the basilar membrane, which responds to every displacement of fluid set up by waves of sound. On the other hand, the titillator is tethered to the containing wall. The essential modifications required to make the otic vesicle into an organ of hearing are (1) a closed vesicle, filled with fluid, and everywhere surrounded by bone of a peculiarly dense nature, all except at one area, where a minute window—the fenestra rotunda—is established. That window is essential; without it there can be no mass displacement of the fluid and therefore no hearing. In the passage leading to that window is placed the organ of Corti. To make the ear a more sensitive machine another window is established in the bony wall—the fenestra ovalis—into which is fixed a

Societies' Proceedings

movable piston, the stapes (Fig. 2). By a bent lever, formed by the ossicles of the ear, this piston is yoked to the membrana tympani, and thus the ear is rendered infinitely more sensitive to sound impulses

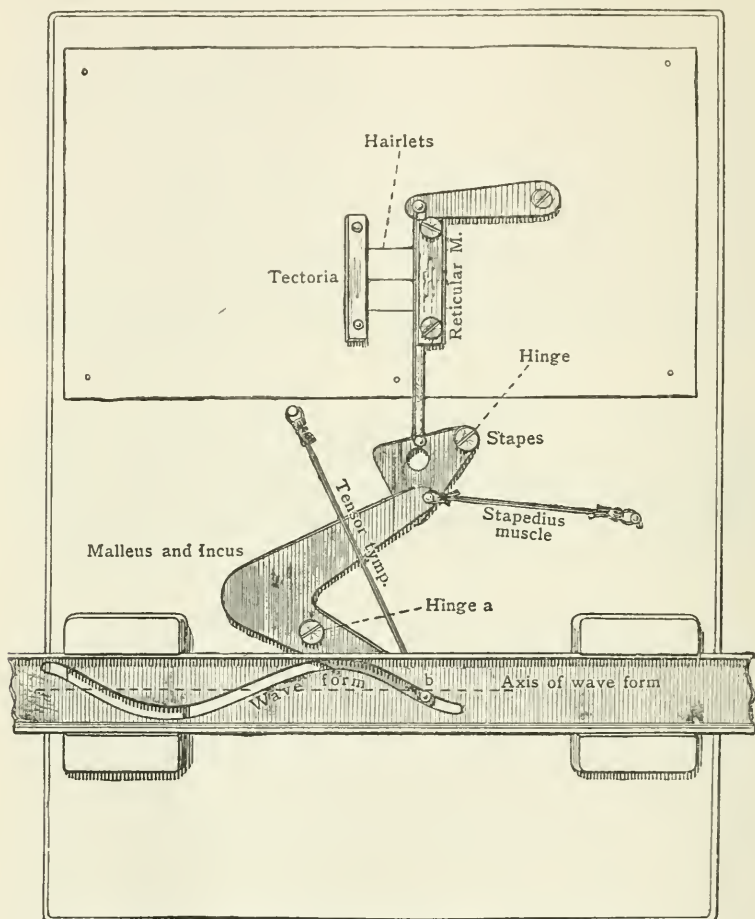
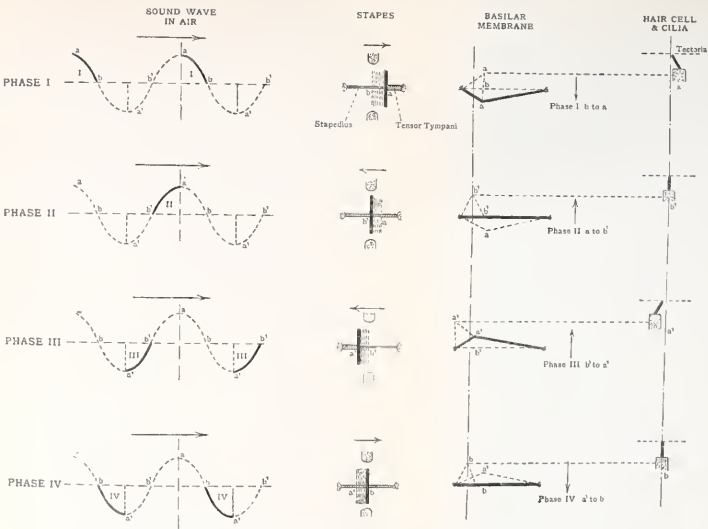


FIG. 2.—Drawing of working model to show action of the stapes. *a*, Hinge on which malleus and incus vibrate. *b*, Pin in end of malleus passing through the curved slot in the sliding plate, representing the wave form. As the sliding plate moves to and fro the pin *b* moves (1) towards and (2) from the stapes. During the first movement (1) the tension of the tensor tympani is relaxed, and during the second (2) it is increased. The opposite conditions prevail as regards the stapedius.

carried by the air. Closure of the fenestra ovalis, by fixation of the stapes, renders the ear more sensitive to bone-conducted waves; closure of the fenestra rotunda produces complete deafness; these facts cannot be explained on the hypothesis put forward by Helmholtz.





NOTE. The Tensor Tympani and Stapedius muscles act on the ossicles in the middle ear but the effect in pulling the stapes inwards and outwards is the same as though they were attached to the stapes in the way indicated in this diagram.

Royal Society of Medicine

Four phases are to be recognised in the completed movement of the hairlet of a sense-cell. Its upright or vertical position may be regarded as one of rest—its zero position. In the first phase the hairlet bends towards one side—towards the left we shall suppose; in the second it returns to its upright or zero position; in the third it bends towards the right; in the fourth it again returns to its starting or zero point. Each phase, we may postulate, gives rise to a nerve impulse or signal. In each sound wave Wrightson recognises four corresponding phases: two of these lie in the part of the wave where the air particles are being condensed—the part in which there is a *plus* pressure; two of them lie in the part where the air particles are being rarefied—where there is a *minus* pressure. Wrightson's original discovery was the recognition of the fact that, if it could be supposed that each phase of a sound wave did give rise to an effective stimulus in the ear, then the brain was supplied through the ear with a sufficiency of data to give a complete analysis of the most complex sound. This theory was a sequel to a neglected discovery of Sir William Bowman about the year 1846, that the basilar membrane is made up of two parts—a striate zone and a hyaline zone; the hyaline zone must be regarded as elastic in nature. In my opinion the various parts of the cochlea, of the organ of Corti, and the conformation of the various liquid passages of the ear now receive a satisfactory explanation. I have no doubt that when physiologists, psychologists, and aural surgeons have mastered the details of the new theory they will find themselves provided with clues to phenomena which were formerly inexplicable. (*See folding Plate.*)

Sir THOMAS WRIGHTSON, Bart.—If a machine is required to transmit the varying pressures of a sound wave to the nerve terminations, that transmission must be of a dead-beat character. This transmission is conveyed from the comparatively large area of the outer drum, through the bent levers of the ossicular chain, to the smaller area of the stapes. The stapes is about one-fifteenth the area of the drum, so that the unit-pressure is increased in the proportion of 1 to 15 in the cochlea. By the laws of equilibrium in fluids, we are bound to admit that every momentary change of unit-pressure in the air-wave would be thus multiplied considerably in the liquid of the cochlea. These varying unit-pressures are instantaneously carried throughout the whole length of the cochlea above the basilar membrane. If two separate pistons are placed in a cylinder with liquid entirely filling the space between them, pressure on the left piston will be transmitted right through the intervening fluid, and move the second piston exactly as though a solid connection existed between the pistons. Transmission of pressure through the cochlea is sometimes by displacement of fluid and sometimes by the action of levers, but the effective units of work impinging on the drum membrane are all to be accounted for in the

Societies' Proceedings

bending of the hairlets or nerve terminations, so that a dead-beat transmission of power exists from drum to hairlet. The basilar membrane is tapered in breadth from nil at the fenestral end to a maximum at the helicotreml end. Only one-fourth of its breadth is

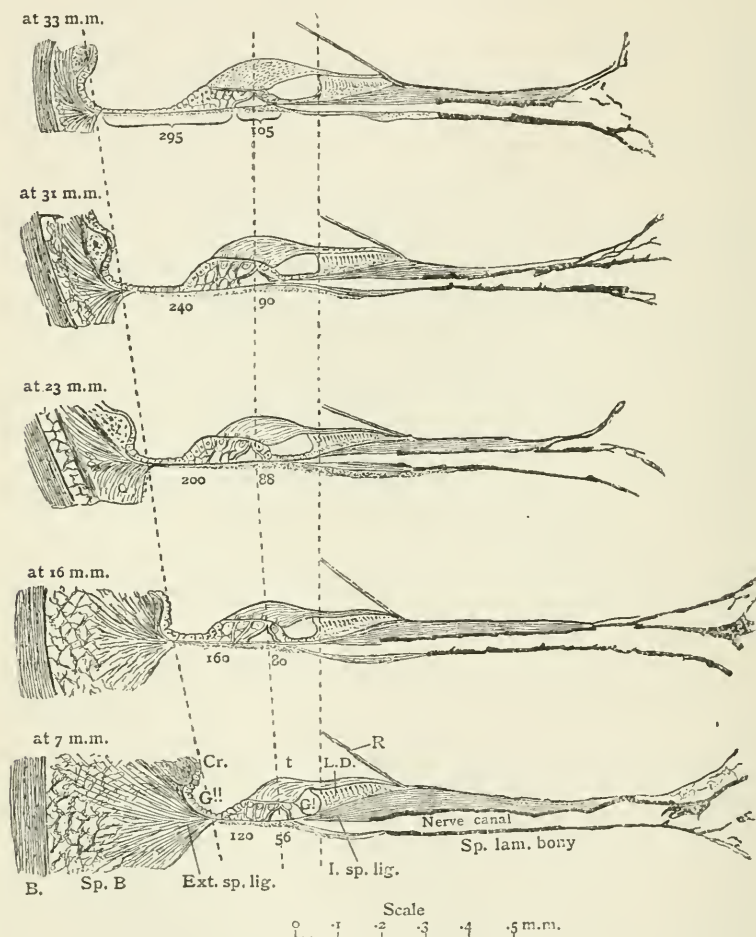


FIG. 3.—Series of drawings of the human cochlea from preparations made by J. S. Fraser and J. K. M. Dickie. The distance of each section from the commencement of the basilar membrane is given. The measurements placed immediately under the basilar membrane refer to the widths of the subarcuate and striate zones.

elastic. The inelastic part is hinged at both ends. When, therefore, the pressure comes upon the whole surface of the membrane a triangular prism of liquid is displaced which at each moment is exactly equal to the displacement of the stapes. To the inner edge of the

Royal Society of Medicine

pectinate or rigid zone are attached the inner legs of Corti arches, and as the outer legs rest as a hinge or pivot upon the sloping edge of the tapered aperture to which the elastic zone is also attached, the up-and-down motion of the membrane causes the apex of the Corti arch to move transversely to and fro. As the pressure, and therefore the motion, is nil at the fenestral end no motion is transmitted at that point, but as the arches approach nearer the helicotrema end of the basilar membrane, the pressure and displacement, and therefore the transverse motion of the apices of the arches, increase to maximum at the helicotrema. The whole of the up-and-down motion of the basilar membrane is carried into the bent levers of the Corti arches, where it is once more carried through rigid levers. From the apex of the Corti arches the pressures pass into the reticular membrane which carries the hairlets. The upper ends of the hairlets penetrate the substance of the tectorius, and the to-and-fro transverse motion of the reticular membrane causes a bending of the hairlets. Such bending will be in proportion to the reactionary pressure at the tip of the hairlet resting in the tectorius. The basilar membrane being thirteen times the area of the stapes the total pressure will, at each moment of time, be thirteen times that on the stapes. The bending of each elastic hairlet is the measure of the pressure between its end and its contact with the tectorius according to its position in the whole length of the basilar membrane (Fig. 3).

Diagrams are shown of the resultant curves of pressure in the liquid of the cochlea, and in these the time positions of the impulses are seen to coincide not only with the well-known time positions of the simple sine wave forms but of compounded tones where the time positions of the differential tones, the summational tones, the octaves and other harmonies are revealed, all being confirmatory of the theory. The residual time-pressure represented by the final liquid curve has to reach the brain by some process. I suggest that this may be explained if we assume a nerve current always passing through the point where the hairlets and tectorius meet. Professor Hughes' great discovery of the action of the microphone shows that where an electric current is passing through a circuit in which a slender point of contact is subjected to the varying pressures of a sound-wave, the sound-wave is transformed into an electric wave, which after passing through a telephone wire to a receiving telephone can then be reconverted into a sound-wave. Such a condition is perhaps worthy of the consideration of physiologists as a means of carrying the wave form to the brain.

DISCUSSION (*abridged*).

THE PRESIDENT.—One point which occurred to me is the question of bone conduction. If the stapes were absolutely fixed, the foramen rotundum closed, the labyrinth would be converted into a rigid body.

Societies' Proceedings

It is difficult to understand exactly how the mechanism described acts when the only means of conduction is through the bone. Are all the waves arriving by bone conduction synchronous, and do they not cause mutual interference? I feel that there is much more capacity in the brain for analysis than is possessed by the much smaller and probably less highly organised nerve elements of the organ of Corti and ganglion spirale.

SIR ROBERT WOODS.—We need have no difficulty in accepting the same kind of stimulus, that is, a purely mechanical stimulus, producing two entirely different effects. The question "why one is translated as a sensation of movement and the other as sound," is a matter for the psychologist to study.

PROFESSOR KEITH.—The only opening which is necessary for hearing is the fenestra rotunda. Where the drum is perforated, pressure on the stapes to keep it firm improves hearing. Under the Helmholtz theory you cannot get an explanation of that fact, but the Wrightson's theory gives you exactly what you want. Supposing you have no drum, but sound-waves are passing through the petrous bone, you will have compression and rarefaction of its contained cavity. During compression the fluid contained will find relief at the fenestra ovalis, and hence never act on the basilar membrane at all. But if you fix the stapes, all the displacement must go towards the fenestra rotunda, and must thus act on the basilar membrane and organ of Corti. If, on the other hand, the fenestra rotunda is blocked, there will be no hearing. I do not think anyone has come across a patient who could hear with both fenestræ blocked.

DR ALBERT GRAY.—In some animals the aqueduct of the cochlea is a wider opening into the labyrinth than either the oval window or the round window. Helmholtz's theory cannot be right, but the theory can be modified. Professor Keith objects to the difficulty of single fibres, vibrating independently of the membrane. The whole membrane can vibrate so long as there are maximum points of vibration. My difficulty with the new theory is chiefly on physiological grounds. We are asked to believe that nerve-fibres can transmit sound vibrations, varying in rate up to 30,000 or 40,000 per second, up to the brain without fusion, at anyrate in the middle part of the scale. That is taking only a simple harmonic tone. What, then, must we think when we come to the analysis of two or a number of these simple tones compounded together? The impulses, when they get to the cerebral cortex, are still compound, and they have to be resolved by the brain cells into stimuli, corresponding to simple harmonic sounds. We have no evidence that such phenomena can occur in nerve tissue, and all the evidence that we have points in the opposite direction. Physiological experiment has shown that the minimum time for a nerve-impulse to pass from an afferent fibre into a nerve-cell and out

Royal Society of Medicine

again by the efferent fibre is 0.003 second. That is to say, that the maximum number of nerve-impulses which can pass into and out of a ganglion cell (bipolar) is 333 per second. If these observations are correct, it is difficult to see how one can accept any theory of hearing that depends upon tone analysis in the brain. As far as the transmission of sound impulses to the tectorial membrane is concerned, I might agree with Sir Thomas Wrightson, but I join issue with him as to the place where the analysis takes place. My inclination is to the view that it takes place in the cochlea, not in the brain.

Mr WAGGETT.—The simple cochlea in the bird was a difficulty under the Helmholtz theory.

Professor KEITH.—The bird's ear gives the strongest support to Sir Thomas Wrightson's theory, which answers all the postulates. In answer to Dr Gray, it astonishes me to suppose that those of us who are so accustomed to listening over the telephone and get all the modulations of the speaker's voice accurately brought through, can think that nature could not do what man has done successfully. Even on Helmholtz's theory we must presume that 16,000 messages can pass per second along the same fibre.

Mr SIDNEY SCOTT.—Aural surgeons meet with many conditions which seem to present stumbling-blocks to the acceptance of this new theory even in its present form. The wave is transmitted by the ossicular chain to the footplate of the stapes and the perilymph. What is happening to the membrana secundaria? Can we accept the view that although the drumhead moves to and fro, there is no wave imparted to the air in the tympanum? Personally I cannot abandon the belief that the sound-wave is transmitted simultaneously to ossicular chain and tympanic air, and so that it acts through both fenestræ of the labyrinth; thus there would be a double compression through the perilymph of the scala tympani and scala vestibuli and across the endolymph to the essential structures for the reception of the sound stimulus. The relationship of the membrana tectoria to the cilia of Corti's cells is most suggestive of the view that the essential mechanism is represented by changes in the contact tension between these two structures.

Sir THOMAS WRIGHTSON.—The fenestra rotunda goes out with exactly the same displacement as the other membrane goes in. In a hydraulic engine the liquid exhaust of the engine has exactly the same cubic displacement as the high pressure of liquid which does the work; but, the work being done, the exhaust goes out at the reduced pressure, reduced in equivalence to the work done. The cochlea is in fact a minute hydraulic engine, which transfers the units of work from the air-waves which fall upon the outer drum to the hairlets at the nerve terminations.

Societies' Proceedings

Mr RICHARD LAKE.—I have wondered why no one has considered the ossicular chain as an accommodating mechanism in the conveyance of sound. When Botey first removed the stapes from animals he found they could hear well without it. Still one cannot help feeling that the ossicles are there for some purpose. If we are prepared for a sudden sound, its occurrence causes us much less inconvenience. In listening intently for fine distant or delicate sounds one can undoubtedly hear more distinctly; I believe the function of the ossicular chain is partly for protection, partly as an accommodating mechanism. The drumhead itself is of no importance in hearing, it is to keep the whole middle ear moist so that sound-waves can pass well through it.

Dr W. HILL.—Are we to understand that that very complicated apparatus, the auditory portion of the labyrinth, is of no use as an analysing organ? It seems that we might as well have had the open auditory apparatus of the crustacean, a cavity furnished with hairs and filled with sea-water containing a few grains of sand. I have long held the view expressed by Mr Lake, that part of the hearing function is not only conduction through the ossicles, but aerial conduction across the tympanum to the membrana secundaria.

Dr DUNDAS GRANT.—How does Sir Thomas Wrightson explain differences in pitch? One of the difficulties in regard to Helmholtz's theory is to imagine the waves running up the scala vestibuli, round the helicotrema, and down the scala tympani; whereas a movement must take place at the base of the cochlea long before that, with a displacement of the membrana basilaris, which is communicated to the fluid beneath it, there being a safety valve in the membrane of the fenestra rotunda. The pressure is equalised all the way up by the basilar membrane being wider at the part where naturally the pressure of the fluid has become almost extinguished, namely, at the apex. Mr Scott has suggested that considerable air-pressure is exercised on the fenestra rotunda from the tympanic cavity which should neutralise pressure from inside the cochlea, but I think that pressure conveyed through such a compressible medium as air is not comparable to that through such an incompressible medium as water. As Sir Thomas Wrightson himself says, there is still a vast hiatus in our knowledge of the conveyance of sound through the cochlea to the brain.

Mr JENKINS.—I should like a definite statement as to whether this theory is based upon a mass movement of the fluid in the cochlea, or not. I think we should have that decided, because everything depends upon it. I found so much difficulty in fitting in any mass-movement theory of hearing that, in 1913, I decided it was

Royal Society of Medicine

a molecular movement in the labyrinth which alone would form the basis of a theory of hearing.

Sir THOMAS WRIGHTSON (in reply).—With regard to bone conduction, this is derived from the air compressions and rarefactions acting on the exterior of the head, causing bone vibrations which are conducted to the walls of the cochlea. Whatever displacement of liquid is effected here must pass the basilar membrane, therefore the hairlets work through the action of that displacement if even the stapes is fixed. Dr Gray said he did not think nerves could pass along the impulses of so many thousand vibrations per second as required under the theory. What about the telephone? Every sound and gradation of sound which a person speaks at one end is passed along the wire, so that every inflection and impulse of the voice is heard by the receiving ear. If, then, waves at this rate can pass through a copper wire, why cannot we conceive of a nerve taking the same number? Yes, the theory is based on the mass movement of fluid.

Note.—Sir Thomas Wrightson's book was reviewed by Dr J. K. Milne Dickie, *Journ. of Laryngology, Rhinology and Otology*, vol. xxxiii., 1918, pp. 380-84. We are indebted to Messrs Macmillan & Co., Publishers, London, for the loan of the illustrations.

A Case of Vertigo, with Obliteration of the Semicircular Canals and part of the Cochlea by Bone.—**Labyrinthotomy**, by Mr RICHARD LAKE. A sailor, aged 23, suffered from severe tinnitus and vertigo. He was absolutely deaf in the right ear and extremely deaf in the left: giddy attacks frequent and pronounced. At operation, the external and posterior canals could not be found, and the vestibule, much smaller than usual, was located with difficulty. The cochlea was a solid mass of bone, and during chiselling was driven into the internal auditory meatus, causing a free flow of cerebro-spinal fluid. The vertigo was distinctly lessened, but the case terminated fatally.

Male, aged 45, after Operation for Epithelioma of Left Auricle, along with Specimen of the Ear, by Mr W. STUART-LOW.—The patient was shown at the November Meeting, 1918, as a case of malignant disease supervening on a surface affected for many years with Lupus erythematosus. On 25th November 1918, the whole auricle and the entire cartilaginous and cutaneo-membranous external meatus were removed. By means of an incision in front of and behind the auricle, the whole external ear was detached. By transverse incisions and the dissecting up of skin flaps, all the glands in the neighbourhood of the ear were removed, and the exposed surfaces scraped and swabbed with chloride of zinc; the entire cutaneous meatus was then forcibly evulsed and zinc solution again applied. The skin flaps were sutured and a rubber tube fixed into the osseous meatus. The wounds healed well.

ABSTRACTS

NOSE AND ACCESSORY SINUSES.

Nasal Sinus Disease in Infants and Young Children. L. W. DEAN
and MARGARET ARMSTRONG. (*Annals of Otology*, Vol. xxviii.,
No. 2, June 1919.)

A large number of children have been referred to Dean by pædiatricians in the effort to find a focus of infection in cases of arthritis and various other conditions. In all cases of infective arthritis in infants and young children the source of infection has been in the upper respiratory tract. The diagnosis of sinus disease is extremely difficult. The most common symptom appears to be sneezing, especially in infants. Discharge from the nose is not particularly frequent. The naso-pharyngoscope has been found very useful. It is used principally when the child is under an anæsthetic just before removal of tonsils and adenoids. An X-ray picture is necessary before exploration of the sinuses in order to ascertain whether the sinus is present or not. The X-ray is, however, unsatisfactory in the diagnosis of disease of the sinuses. Many cases of sinus disease clear up after removal of tonsils and adenoids. Out of 145 cases of tonsils and adenoids 65 had sinusitis. In diagnosis the macroscopic appearances of the wash-out are not considered sufficient, but cultures are made. Under the strictest asepsis, a trocar is introduced into the antra. A long fine needle is put in through the cannula and a small quantity of sterile saline is injected and withdrawn. Cultures and inoculations are made from this fluid.

Of 98 cases investigated in this way, there were pathological organisms present in 35 cases, or 51 antra. In 45 instances a staphylococcus was present, in 13 a pneumococcus, in 8 a gram-negative bacillus, in 7 a diphtheroid bacillus, in 7 micrococcus catarrhalis, in 5 *S. hæmolyticus*, in 1 *S. viridans*, and in 2 a Friedländer bacillus. In a group of 12 arthritis cases which did not clear up after removal of tonsils and adenoids, 9 had definite pus in the antra. In 11 of them a hæmolytic streptococcus was found. When rabbits were inoculated with these strains, the animals that did not die of acute toxæmia developed arthritis.

J. K. MILNE DICKIE.

Pneumo-Sinus Frontalis Dilatans. C. E. BENJAMINS (Utrecht).
(*Acta Oto-laryngologica*, Vol. i., Fasc. 2 and 3.)

The writer describes a case of this very rare condition in which the cavity of the sinus becomes gradually expanded by pushing

Nose and Accessory Sinuses

out of its bony walls, and which differs essentially from pneumatocœle in the absence of air under the soft parts covering the sinus, and in the fact that the bony walls are always intact. The most probable cause of the condition is that in some manner there is formed in the naso-frontal duct a valve of such a nature that it permits the entry of air into the sinus during forced expiratory efforts (sneezing, blowing the nose, etc.), but prevents its exit. In the writer's case a small polypus was present in the duct and may have acted in this way. Only 5 other cases are to be found in the literature, 3 affecting the frontal sinus, 1 the maxillary, and 1 the ethmoidal cells. The treatment consists simply in establishing a large communication with the nose so as to do away with the valvular mechanism.

THOMAS GUTHRIE.

Cerebral Abscess of Frontal Sinus Origin. F. LEEGAARD.

(*Laryngoscope*, 1920, Vol. xxv., p. 38.)

The author has had four cases of this complication of frontal sinusitis and finds that the diagnosis is a matter of great difficulty, as there are no localising symptoms. Orbital complications were present in two of the four cases of frontal lobe abscess.

J. S. FRASER.

Brain Abscess in Acute Infection of Nasal Accessory Sinuses. L. W.

JESSAMAN. (*The Laryngoscope*, 1920, Vol. xxx., p. 147.)

Jessaman records a case which occurred in one of the British hospitals in France. Patient admitted with influenza and treated for two weeks, then referred to the writer because of persistent pain in the left frontal region. On examination Jessaman found tenderness over left frontal sinus and thick pus beneath the middle turbinate. Operation under local anæsthesia. Part of the left middle turbinate removed and ethmoid cells exenterated. On the second day the temperature rose to 104° and the patient complained of severe pain in the legs. On the fifth day he had some trouble in talking. On the eighth morning there was motor aphasia, marked paresis of right arm and leg. Second operation: Under general anæsthesia the frontal sinus was opened and found filled with pus. Posterior wall removed. The brain was explored and a small amount of pus evacuated. The following day the paresis was less but the aphasia was unchanged. Gordon Holmes now diagnosed an abscess in the white matter pressing on the cortical centres, and he advised further exploration. Third operation: A very large sub-dural abscess was found. Pus also was discharging from the brain. Paralysis of right arm and leg became complete. Patient died six days later.

Autopsy.—Entire surface of left hemisphere covered with thick pus. Dura over the ethmoid much thickened. No pus was found

Abstracts

between the dura and the bone. Ethmoid necrotic. Jessaman states that the autopsy findings showed the real point of invasion to have been from the ethmoid.

J. S. FRASER.

LARYNX.

Complete Extirpation of the Larynx in Carcinoma. T. HOSHINO.
(*Annals of Otology*, Vol. xxviii., 2nd June 1919.)

The author has had under his care 41 cases of laryngeal cancer, in 16 of which complete extirpation of the larynx was carried out. The operations were done under local anæsthesia, $\frac{1}{2}$ per cent. novocain being the drug employed. The cervical nerves were blocked behind the sterno-mastoid on each side and both superior laryngeal nerves were also blocked. The pharynx was painted with 10 per cent. cocaine. This procedure was found completely satisfactory. A median incision with two cross cuts is preferred. It is recommended that the trachea be brought to the surface through a separate incision. The author lays great stress on careful suturing of the pharynx. He uses two rows of sutures of the Lembert type, which do not completely penetrate the mucous membrane. As regards after-treatment, it is important to wash out the naso-pharynx frequently, as the patient is unable to clear it for himself. With the help of an artificial larynx a fair voice can be obtained, but the author has found that the patients can whisper easily with the help of a simple rubber tube from the trachea held in the angle of the mouth. Most of the patients found this more satisfactory than using the artificial larynx. Of the 16 cases, 8 have shown recurrences, and 8 have remained free. In all the cases the disease was fairly well advanced and the majority of the growths were on the false cords.

J. K. MILNE DICKIE.

Bronchitis due to Empyema of the Maxillary Antrum. A. E. MILLS.
(*Medical Journal of Australia*, 22nd May 1920, Vol. i., 7th year, No. 21, p. 487.)

Mills, Professor of Medicine, Sydney University, in a lecture to his students presents the history of three cases of bronchitis, lasting since infancy in three subjects, aged six, nine, and fourteen years, in all of whom there was a muco-purulent discharge from the nose and nasopharynx for which the advice of a rhinologist was sought. Mills found in each case both maxillary antra full of pus. The symptom common to all was a short, loose, irritating, ineffectual cough, giving the impression that phlegm was constantly present in the throat, and was only partially dislodged.

Pharynx and Nasopharynx

Mills believes that the bronchitis was primary in these cases, and as it persisted, the antra became infected in common with other parts of the respiratory tract. Treatment of such bronchitis must begin with drainage of the antra.

The prognosis is hopeful when this source of infection is discovered and removed.

A. J. BRADY.

PHARYNX AND NASOPHARYNX.

A Note on the Clinical Diagnosis of Diphtheria and other Exudations in the Throat. H. DRINKWATER. (*Lancet*, 1920, Vol. i., p. 1160.)

A considerable percentage of cases certified as diphtheria and sent to the Fever Hospital, of which the writer had charge, have been cases of follicular tonsillitis, influenza, and simple catarrh. Other suspicious cases have also been treated for several days as "quinsy." The author suggests that if certain visible characteristics be carefully observed, diagnosis by ocular inspection can be made at once. His own naked-eye diagnoses have, in every case, been confirmed by subsequent bacteriological examination, except in the case of Vincent's angina. The characteristics of a diphtheria patch are:—

- (1) It is raised above the level of the mucous membrane.
- (2) The edges are sharply defined all round.
- (3) The colour varies greatly; white and glistening, bluish, yellow, or spotted, with black or red. It is rarely like "wet-wash-leather."

The paper is illustrated by eighteen sketches.

MACLEOD YEARSLEY.

The Treatment of Diphtheria Carriers with Detoxicated Klebs-Löffler Vaccine. A. R. FRASER and A. G. B. DUNCAN. (*Lancet*, 1920, Vol. ii., p. 994.)

Those authors conclude that exactly what determinates the chronicity of carriers is not yet clear, and we are still unaware of the process whereby the convalescent with delayed resolution becomes free. The cure of carriers is the most hopeful form of prophylaxis. Vaccine is the method of most promising efficiency in dealing with contacts, convalescents, and carriers. Antitoxin protects only from the toxin produced by the living Klebs-Löffler bacilli in the tissues. The vaccine prevents the growth and life of the bacilli. In diphtheria both vaccine and antitoxin should be given. The advantage of dosage allowed by employing detoxicated vaccine must not be overlooked.

MACLEOD YEARSLEY.

Abstracts

Tonsillectomy as a means of Treatment in Diphtheria Carriers.

GRAHAM BROWN and E. KENT-HUGHES. (*Medical Journal of Australia*, 17th April 1920.)

The writers begin by stating that diphtheria is very prevalent in Brisbane, and that the number of children who are carriers is large. One school of 800 scholars gave a positive result in 12 per cent. This number includes diphtheria cases of so-called non-virulent type.

The health regulations of the State of Queensland require three consecutive negative swabbings, at not less than forty-eight hours intervals, before the patient can be discharged.

The writers state that previous to their practice of performing the operations of tonsillectomy and adenoidectomy, patients have remained in the hospital for 190 days before they could be declared free of diphtheric germs, and some have returned with relapses. During the year 1919 over 100 cases were operated on—"Tonsillectomy, Sluder's method, Heath's tonsillotome." Nasopharynx carefully cleared of all vegetations. The average time after operation until three negative swabbings were obtained was ten days.

When, as was shown by examination of removed tonsils, there are nests of diphtheria bacilli at the bottom of crypts close to the capsule, it was evident that attempts at surface disinfection would have been of little avail. Their experience coincides with that of several other observers quoted in the paper.

A. J. BRADY.

The Problem of the "Positive Throat" in Diphtheria Convalescents.

J. L. BROWNLIE. (*Lancet*, 1920, Vol. i., p. 706.)

The paper discusses fifty consecutive cases which were treated by vaccine. The writer considers that local antiseptic applications are unsatisfactory in the treatment of the carrier or the positive throat. Diphtheria vaccine produces degeneracy and consequent alteration in the form of the cultured organism, followed by its complete disappearance from the locality invaded. Diphtheria carriers were, in the past, subjected to hospital residence for weeks or even months, but may now be effectively treated by vaccine. The economic advantages of the treatment are obvious.

MACLEOD YEARSLEY.

PERORAL ENDOSCOPY.

Arachidic Bronchitis. CHEVALIER JACKSON and W. H. SPENCER.

(*Journ. Amer. Med. Assoc.*, Vol. lxxiii., No. 9, 30th August 1919.)

The authors give an analysis of 16 cases in which portions of peanut kernel were removed from the bronchi. The term "arachidic" is justified by the fact that the aspiration of a peanut (*arachis*) kernel in children causes a definite syndrome, due to some inherent property

Peroral Endoscopy

in the peanut rendering it far more irritating than any other form of foreign body in the bronchus. The pathological condition consists of an cedematous purulent tracheo-bronchitis, which, if not fatal, causes pulmonary abscess. The condition may have to be differentiated from laryngo-tracheal diphtheria. Prognosis is grave if the foreign body is not removed. Young children are apt to succumb quickly from exhaustion and toxæmia.

PERRY GOLDSMITH.

The Protection of the Throat during Mouth Operations. D. O. HENSON. (*Dental Cosmos*, May 1920.)

In view of the serious consequences which may arise, should some small object, such as a crown, an inlay or a branch, slip from the dentist's fingers, it is recommended that a piece of three-inch bandage be laid on the back part of the tongue, with the ends projecting from each side of the mouth. This simple safeguard is apt to be neglected in dental practice.

DOUGLAS GUTHRIE.

Foreign Bodies of Dental Origin in a Bronchus; Pulmonary Complication. C. A. HEDBLÖM. (*Annals of Surgery*, May 1920.)

In the last four years the author has had seven cases of pulmonary suppuraton following dental operations or dental trauma. In two cases the tooth was spontaneously expelled; in one it was discharged through a thoracotomy wound; in one it was found post-mortem; in the rest no foreign body was found. The author has collected 45 other cases from the literature, and he gives an analysis of the total of 52. A tooth was present in the bronchus in 37, and an artificial tooth in 4 cases. The foreign body was present in the right bronchus in 21 instances, in the left in 19, and in both in one case. In 26 cases aspiration of the foreign body had occurred during general anæsthesia, in 12 under nitrous oxide, in 11 under ether, in 3 under chloroform, and in 4 cases where there was no anæsthesia. In 16 cases there was no serious pulmonary complication, while in 36 suppuraton occurred. In the 36 complicated cases there was a latent symptomless period in 15. The duration of the latent period was of varying periods up to seven months. In 29 cases cough was the predominant symptom, hæmorrhage in 8, and pain in the chest in 11. Fourteen of the 36 cases with complications died. Sixteen completely recovered. Of the 14 cases in which the foreign body was expelled, 7 recovered, while 3 died. In all the fatal cases the foreign body had been present for a long period. With regard to the likelihood of spontaneous expulsion the following figures may be of interest. The foreign body was expelled in only 3 out of 13 cases before the onset of suppuraton, and in 13 out of 33 after the onset of suppuraton.

J. K. MILNE DICKIE.

Abstracts

ŒSOPHAGUS AND BRONCHI.

Foreign Bodies in the Air and Upper Food-Passages in Pre-Endoscopic Days. HUBERT ARROWSMITH. (*The Laryngoscope*, November 1919, Vol. xxix., p. 633.)

The writer gives a short historical account of early methods. He notes that in 1858 Bennett, Professor of Clinical Medicine in Edinburgh, described the introduction of a catheter into the bronchi of seven patients, in one of whom he "injected the lung" eleven times, starting with 2 drm. of a (30 gr. to the ounce) solution of silver nitrate and reaching $\frac{1}{2}$ oz. of a 40-gr. solution; operator, treatment and patient all heroic! This was the precursor of our present methods of endoscopic medication. Arrowsmith has culled from a large number of reports over 160 cases. Foreign bodies in the air-passages numbered 137; in the œsophagus there were 23 and 2 lye strictures; in the pharynx, 4. The intruding material was as follows: Fruit-seeds and pips, 23; beans and grains, 34; nut-shells, 13; needles and pins, 12; buttons, 4; coins, 9; bones, 14; teeth, 2; tooth-plates, 4; thimbles, 2; fish-hook, 1; broken tracheotomy tube, 1.

There were only 22 deaths in 160 foreign-body cases. Treatment had been attempted in 6 patients unsuccessfully. Our predecessors obtained 19 autopsies in these 22 cases—a far larger proportion than we are able to secure. In 41 instances the foreign body was spontaneously coughed up. In an interesting series of tracheotomies the foreign body was expelled through the wound or displaced into the mouth, swallowed and passed by the bowel. Immediate expulsion, 34; delayed expulsion, 18. There were 48 successfully planned extractions from the pharynx, larynx, trachea, bronchi, and œsophagus.

Arrowsmith admits that in the light of our present knowledge this series is not a fair presentation of the clinical history of foreign bodies, even in those times.

J. S. FRASER.

Syphilitic Stricture of the Trachea. CADE & BRETTE. (*Soc. des sc. med. de Lyons*, 2nd December 1919.)

A man, aged 37, who contracted syphilis at the age of 18, suffered from shortness of breath, which was steadily becoming worse. His voice was unaltered. Moist râles heard over both lungs. There were signs of old iritis of left eye, a hard swelling of one testicle, and a perforation of the soft palate. No tubercle bacilli in sputum. The larynx appeared normal. The patient died of asphyxia a week after admission to hospital. Post-mortem report—lungs broncho-pneumonic, larynx healthy. In the trachea, 4 c.m. before the cricoid, was a narrow stricture of the calibre of a goose quill. Below the stricture, in the trachea and bronchi, were a number of inflammatory patches, some of them ulcerated.

DOUGLAS GUTHRIE.

REVIEWS OF BOOKS

Forensic Otology. By DOZENT D. R. IMHOFER, of the University of Prague. Leipzig: Verlag von Curt Kabitzsch. 1920.

The original intention of the author was to produce a work on Otology, dealing mainly with accidents, compensation questions, insurance, military services, etc., but after considerable amputations the result is a somewhat condensed description of Forensic Otology. The material was obtained chiefly at the garrison hospital at Krakau from 1915 to 1918.

The Anatomy and Physiology of the Ear are described from a forensic point of view. The lower tone limit is given as 16, and the upper as 50,000. The description of injuries to the ear covers more than half the text, and is given in full, including, among others, gunshot wounds, injuries caused by lightning, operations, etc. The classification of such injuries is obviously a difficult matter. The chapter on Simulation of Deafness is very interesting, and a résumé of methods of testing such cases is given; but too much stress is laid on the instinctive feeling an experienced Aurist has when a case of simulated deafness comes before him. Mention is made of "Psychogalvanic Reflexes," originally described by von Albert, as being useful in testing for simulated and hysterical deafness. The rest of the book considers ear diseases, insanity, and hysteria in their relationship to one another.

A very wide study of the literature has been made, and the text abounds with references, though those to British literature are conspicuous by their absence. As such a thorough study has been made of the subject, it seems a pity that publication was not postponed till the author was able to carry out his original ideas. We hope this may eventually be possible.

As a work of reference for the Otologist it is to be highly recommended, especially to those engaged on Pension Boards in this country; but the title may be misleading to those outside the specialty who are interested in Forensic Otology, as, for instance, the legal profession.

ANDREW CAMPBELL.

Anæsthetics: their Uses and Administration. By DUDLEY WILMOT BUXTON, M.D. Sixth Edition. Pp. xiv + 535, with 89 illustrations. H. K. Lewis & Co., Ltd., London. 1920.

Dr Dudley Buxton's well-known text-book has now reached its sixth edition and can be recommended as a thoroughly reliable guide to the principles and practice of Anæsthesia.

General Notes

The chapter on shock in its relation to Anæsthesia is excellent, and epitomises the most recent developments of this important subject.

The various methods of inducing anæsthesia employed in intra-oral and intra-nasal surgery are described, but, in the opinion of the reviewer, sufficient prominence is not accorded to chloride of ethyl anæsthesia for the removal of tonsils and adenoids, nor, in this connection, is mention made of the method, introduced by Dr J. H. Gibbs, of evaporating the chloride of ethyl by the simple device of boiling it, by immersion in hot water of the small glass vessel into which it has been sprayed, the vapour then being conducted into the rubber bag of the inhaler by means of a tube. In this way the rate of delivery and the amount of the agent used can be regulated in a manner that can hardly be possible by the method described by Dr Buxton on pp. 318-19.

The whole book has been carefully revised and its value is enhanced by numerous illustrations. H. TORRANCE THOMSON.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W.

Section of Laryngology (President, Dr W. Jobson Horne).—The March Meeting of the Section will be held on the 4th of the month, at 4 P.M. Members intending to show cases or specimens should send in their notes a fortnight before that date to the Hon. Secretaries, C. W. M. Hope, 22 Queen Anne Street, W. 1, or W. G. Howarth, 75 Harley Street, London, W. 1.

Section of Otology (President, Sir Charles Ballance).—The next Meeting of the Section will be held on Friday, 18th February 1921. All notices of papers and specimens should be sent to the Secretaries, Lionel Colledge, 22 Queen Anne Street, W. 1, or Norman Patterson, 24 Park Crescent, London, W. 1.

The Belgian Society of Otology, Rhinology, and Laryngology will hold its next Meeting in Brussels on 20th February under the Presidency of M. le Docteur Charles Goris.

Dr Henry Peterkin (Aberdeen) has been elected President of the Scottish Otological and Laryngological Society for the year 1921.

Drs Jacques, Lannois, and Mouret have been appointed Professors in Diseases of the Ear, Nose, and Throat in the Universities of Lyons, Montpellier, and Nancy respectively.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

THE ETHMOIDAL PROBLEM.*

By ROSS HALL SKILLERN, Philadelphia, U.S.A.

A PATIENT, usually of importance, has been under our care for some time with a profuse chronic unilateral muco-purulent discharge, for the most part post-nasal, particularly annoying in the morning, chiefly on account of the glue-like secretion which accumulates in the throat and nasopharynx. After weeks of treatment and having convinced ourselves that the frontal, maxillary, and sphenoid are not diseased, in an unguarded moment, perhaps having lost patience, we suggest opening and curettage of the ethmoid cells. This advice is readily accepted and the operation performed, intra-nasally of course, and under local anæsthesia. We are surprised at the small quantity of purulent secretion which is evacuated, and at the amount of apparently healthy or but slightly affected mucosa which is removed during the operation. In any event, at the conclusion of the procedure, we are not entirely satisfied. It occurs to us that the macroscopic pathology of the removed fragments did not justify the assumption that they were solely the cause of the troublesome discharge which had proved of such annoyance to the patient. Consequently, the suggestion and even the apprehension arise that we have not been as thorough in our exenteration as we might have been, and indeed, as subsequent events prove, as was necessary for the eradication of the infection. However, we are quite optimistic and feel that, after all, with the cells opened and with regular

* Read before the Texas State Medical Association, 24th April 1920.

Ross Hall Skillern

applications of argyrol or similar pigments, at least a great amelioration of the symptoms will be brought about. After many more weeks of treatment, the fact is gradually driven home (disagreeable as it is) that the condition of the patient is not only unimproved but, if anything, is actually made worse as a result of our careful and painstaking surgery. This is the dilemma in which we find ourselves, and finally we are only too glad to hand over the patient, not infrequently at his own suggestion, to the care and responsibility of one of our colleagues, in whose hands he probably will fare but little better than he did under our own manipulations.

This is a typical retrospect of many of these cases. It is my purpose to continue the narrative from this point, and to analyse as far as possible the cause of our failures, as well as to advance certain suggestions as to the procedures to be adopted for the ultimate eradication of the infection.

It will be of little avail to state that we should not have operated in the first place, at least, in the method that was followed. Indiscriminate removal of all the ethmoid cells within reach of our forceps was as unnecessary as it was unscientific. We departed from the old maxim in sinus affections, "Find the pus and follow it to its source." We used our best judgment, and by a sweeping operation hoped to include all the infected parts within the scope of our surgical procedure. From the very first, however, we were practically certain to fail on account of the almost insurmountable obstacles which are, for the most part, present in suppurative ethmoiditis. In the vast majority of cases it is difficult and often impossible to open adequately all ethmoid cells by intra-nasal methods. The cells which are most severely infected are usually those lying in the most inaccessible places as, for example, a supra-orbital cell in the anterior group or a deep-lying supra-maxillary cell in the posterior group. These can be and, as a matter of fact, usually are left undisturbed after even a complete intra-nasal exenteration, where they remain to reinfect the remnants of the previously healthy cells which have been reduced to a disorganised mass by our forceps and curette. In the ordinary run of these cases where the discharge was the predominating symptom, we should have curbed our impatience and systematically studied the condition with all the means at our disposal. This can properly be preceded by complete removal of the middle turbinate followed by a

The Ethmoidal Problem

satisfactory stereoscopic X-ray. Careful and persistent study of these negatives will disclose the anatomic formation of the cells, even if they fail to show the diseased area which, in my experience, they seldom do in a convincing manner. The so-called extra-capsular cells (fronto-ethmoidal, orbito-ethmoidal, and maxillo-ethmoidal) are plainly seen in both shape and extent. This knowledge is of inestimable value in making subsequent deductions as to the probable origin of the pathological secretion, and will very materially influence and limit the extent of the surgical interference. How much more satisfactory it is to have as a definite object the opening and draining of one or two large suspicious cells than to indiscriminately clean out the whole ethmoid in the hope of removing the diseased with the healthy structures.

The exact method to be followed will, of course, vary with each individual case, and is dependant upon following the pus to its source, a procedure which may be long and tedious, but if carried to a successful termination will more than repay us by the conservation of tissue and by the prevention of the chronic state, not to mention the satisfaction derived from the result.

To revert then to our patient, we will presume that conservative means have been applied for a sufficient length of time, with little or no influence upon the course of the disease. The suppuration continues with but slight abatement, and it becomes apparent that it can only be greatly influenced by some form of surgical intervention. What shall this consist of? To open the lid of the ethmoid by removing the middle turbinate, or by assuming the entire labyrinth should be removed and proceeding according to the method of Mosher? Obviously the latter is preferable if we are convinced that a complete exenteration is indicated; but, in our case, we are by no means certain that the infection is not localised to a few cells, in which it will be possible to bring about a cure and at the same time conserve a large portion of the ethmoidal structures. In these circumstances the removal of the middle turbinate is unquestionably to be preferred; but we are very apt at this point to disregard our patient, and to continue the operation by removing those cells which lie convenient to our forceps. This has proved, in my hands at least, to be an irretrievable blunder. Had our better judgment been followed, we would have contented ourselves with the turbinectomy, and, after healing had occurred, continued with the further study of the case. In this way not only

Ross Hall Skillern

would the patient have had the benefit of the doubt as to whether resolution would have followed, due to the resultant aeration and drainage incident upon the removal of the turbinate, but the operator would have been in a far better position to follow up and judge the origin of the purulent secretion. In this way the offending cells can usually be detected, and by constant and persistent attention to these, the infection is finally eradicated.

Suppose, however, we have followed our first inclination, and after removal of the turbinate, attacked with forceps and curette all cells within reach, not neglecting to open the sphenoid. What is the result? Either we have, among other things, reached the diseased parts and removed them sufficiently to bring about a cure, or the patient returns in a few weeks with the most intractable case of suppurating ethmoiditis we have ever had on our hands. The symptoms are too well known to all of us for further comment, but we may recall the morning accumulation of glue-like masses in the nasopharynx and constant nasal and post-nasal discharge. On examination, the ethmoidal region appears to be bathed in pus, which does not seem to take its origin from any particular locality, but fairly exudes from the whole of our former operative field. Removal of this secretion as carefully as we can, either by cotton mop or lavage, fails to disclose its precise origin, and no form of conservative treatment, from the application of aseptic irrigations, followed by medicaments, to suction, seems to have more than the slightest temporary influence upon its course.

Now let us consider the precise pathological condition that confronts us. We have indiscriminately removed all ethmoid cells within reach to the best of our ability, but nevertheless we have unavoidably left a portion of those originally affected, with the result that, instead of the affection being eradicated, it gradually spread through the broken-down and macerated structures until the whole mass has become involved. This presents a very different problem from that which originally confronted us, particularly when one considers the pathological changes that have been wrought. The primary condition was one of purulent infection of one or more, possibly a group of cells, the mucosa of which was thickened and inflamed, but the osseous structures were unchanged both as to form and position. In other words, the labyrinth was intact. Now, in its place, we are dealing with a disorganised and suppurating mass, the land-

The Ethmoidal Problem

marks having been more or less obliterated. The bone has attempted to regenerate with the formation of proliferations of new osseous tissue through the trabeculæ of the cell remnants as well as the basic structures (*lamina papyracea*). Fibrous connective tissue has replaced the exuberant granulations which had succeeded the torn and traumatised mucosa, with the result that now a semi-dense, suppurating, disorganised mass occupies the position of the area operated upon. Further operative procedures are soon found to be worse than useless, the fibrous character of the attacked tissues making the removal difficult and, on account of the force required, even dangerous. Given, however, that in an exceptionally favourable case a large portion of this mass was removed, in but a comparatively short time re-infection from the original focus would occur, with a return to the old condition.

This brings us to the serious consideration of our question—the ethmoidal problem. Let us consider that one of these operated cases has presented himself for treatment. Examination has elicited the facts and conditions enumerated above. What shall be our line of procedure? Experience has, or should have, taught us that further haphazard removal of tissue will avail nothing, nor can conservative measures be continued indefinitely. We must revert to the old maxim:—find the pus and follow it to its source. But if it was difficult to apply this before, now it has become almost impossible; nevertheless, this must be attempted in order to scientifically and accurately bring the case to a satisfactory conclusion. When one examines the affected region even after thorough irrigation, the task appears thoroughly hopeless, purulent secretion everywhere but apparently coming from nowhere. Even the most painstaking probing fails to find a reservoir, although irrigation into any cavity or recess never fails to bring forth traces of pus.

In order to ascertain the source of the discharge, we must begin the systematic study of the case by excluding both the sphenoid sinus and maxillary antrum which almost invariably have become infected during the course of the disease. Needle puncture will bring forth the contents of the antrum, while the cotton tipped applicator introduced into the opening of the sphenoid will disclose the nature of its contained secretion. Let us consider how far these cavities are responsible for the amount which accumulates daily in the nose and nasopharynx of the patient? Several methods have been advanced to

Ross Hall Skillern

accomplish this purpose, but I have found that the most satisfactory consists in the introduction of a small quantity of powdered methylene blue on a cotton pledget into the sphenoid after thorough cleansing and drying. Into the maxillary sinus it can be insufflated through a Lichtwitz needle. The patient is instructed not to blow the nose or clear the throat as far as possible until the next morning, and then to use a large cloth or towel. Comparison of the masses of blown or hawked out secretion will at once show the amount that is tinged with blue and that which is clear of colouring matter, thus giving reliable data from which to draw a conclusion. For corroborative purposes this can be repeated until no further doubts exist. If it is shown that the mucosa of the sphenoidal or maxillary cavity is secreting a considerable amount, a differential diagnosis between these two can be made by alternating the application of the methylene blue between them.

Let us presume we have disclosed that both these cavities contribute sensibly to the whole amount of secretion. Our first endeavour is to eliminate these from further participation in its production. This can be accomplished in the case of the sphenoid by removing the entire anterior wall, particularly toward the floor, and the application of nitrate of silver solution in suitable strength (gr. xxx-lx to oz.). In the case of the antrum, other measures may be necessary, such as a large opening below the inferior turbinate. Only after the discharge from these has been controlled should the ethmoid be attacked, but it should be remembered that the antrum can and often does act as a receptacle for the secretion exuded from the ethmoid.

In order to investigate the site of the discharge, it is necessary to consider the anatomical subdivision of the ethmoid into the anterior and posterior group of cells, and to endeavour to ascertain whether either of these groups or both are exuding the pathological secretion. At this point it is well to recall that the anterior cells are small and shallow, while the posterior are large and deep; therefore the chances are overwhelmingly in favour of the latter being at fault, particularly if the presence of a fronto-orbital cell is excluded, which can be done by study of the stereoptical plates. If repeated inspection and the use of the probe show that one of the constant sources of the secretion lies in the region of the uncinate process, it can pretty well be taken for granted that the secreting area lies in the immediate

The Ethmoidal Problem

proximity. If, on the other hand, the discharge is for the most part post-nasal and irrigation over the spheno-ethmoidal region invariably produces shreds and irregular globules of pus, it can hardly be controverted if we state that the infecting source lies in the posterior cells. If discharge be present in both areas, which more often is the rule in these cases, the entire mass is usually involved. Suppuration in the anterior cells demands the removal of the uncinate process in order to uncover those situated along the infundibulum as well as in the *agger nasi*, but it has been my experience that this alone is of little avail as that portion of the ethmoid lying posterior to the lamella of the middle turbinate is always co-affected and requires resection before the infecting process can be brought to a halt. By reason of the operative space thus gained by removal of the uncinate process, the lamella of the middle turbinate can be broken through and the remnants of the posterior cells reached with much greater facility and thoroughness than was previously possible. One is often enabled to make a complete exenteration to the orbital plate and into the spheno-ethmoidal fissure. The basic remains of the bony partitions can be fairly well smoothed off by sand-papering with compact wads of cotton held in the blades of the nasal forceps. After-treatment should consist in daily irrigations with a suitable solution such as hyperchlorite of sodium. Excessive granulations may be touched with a strong solution of silver nitrate. Even should it be determined that the posterior cells are solely involved, this method will give better results than attempting to remove them over the remains of the middle turbinate lamella, as a much wider field is present after the uncinate process is resected and there is less likelihood of overlooking pockets of infected mucosa. If this fails, I know of nothing that remains except the external operation.

Guisez's method or the external operation through the orbital plate is rarely indicated in these cases simply because the patient will not permit it, his symptoms not being of the severity to warrant such a radical procedure. At the most, he has a post-nasal discharge which is particularly irritating on rising, but after being cleaned out he is fairly comfortable during the day. Headaches are usually not particularly disturbing and retention symptoms rarely present, as the cells have for the most part been widely opened and their points of least resistance are toward the nasal cavity.

On the other hand, absolute indications for the external

Ross Hall Skillern

operation occur after intra-nasal methods have been tried, when certain eventualities prevail such as (1) the pressure of a large infected fronto-ethmoidal cell which cannot adequately be opened and drained intra-nasally; (2) the occurrence of frequent and severe headaches traceable to the infection despite treatment; (3) progressively increasing septic condition of the patient; (4) external fistula formation; (5) threatened or actual orbital or cerebral complications.

Ultimate Results from Operative Procedures.—In the uncomplicated case of purulent ethmoiditis without polyp formation, after the removal of the middle turbinate, the results obtained are usually inversely to the extent of the surgical disturbance; in other words, the greater the operative interference the less likelihood of return to normal and ultimate cure. Experience shows that once the middle turbinate is disposed of, the ethmoid labyrinth lends itself to conservative treatment and responds correspondingly with much greater facility than heretofore. In addition to this, the relations having been undisturbed, the ethmoid capsule and cells remain uninjured and intact. After a week or ten days we are in a much more favourable position to study and treat the pathological process, not to mention the benefit derived from the aeration and drainage effected by the turbinectomy. The infection will have a tendency to limit itself to one cell or to a small group of cells, which only the most careful and persistent study will disclose. This being finally accomplished, it is a comparatively easy matter to install a large opening in their most dependant parts with a suitable hook, thus permitting aeration and drainage which, coupled with irrigation, soon eliminates the active infection and puts the parts on the road towards resolution. In this instance the actual surgical interference has been small, therefore the function of the nose will be unimpaired and the cure may be termed physiological as well as therapeutic, leaving nothing to be desired.

Unfortunately, this termination has been rarely observed owing to the fact that we have not followed a rational and systematic line of procedure. Our errors were either of omission or commission, we did not operate at all, or, having decided to operate, we were not satisfied with a simple turbinectomy, but continued by removing certain of the ethmoid cells. The results of this are, of course, a continuation of the suppurative process, together with a disorganisation of the ethmoid structures

The Ethmoidal Problem

which makes a comprehensive study almost impossible. We can therefore state that the ultimate results of this form of operation are to all intents and purposes disappointing and unsatisfactory.

The next step is the complete intra-nasal exenteration, after removal of the uncinate process. This, in my hands, except in isolated instances, has been disappointing for the reason that it has been applied only as a semi-final resort, when the pathological process has invaded the basic structures to such an extent that any intra-nasal procedure has been practically hopeless from the first. In those cases where the anatomical configuration lent itself easily to intra-nasal measures, the ultimate results have been crowned with success; but the cures have never been so striking as in the first instance, as the patient was subject to more or less permanent discharge, particularly on the inception of every fresh cold in the head.

As far as the external radical operation is concerned, my experience has been limited to a dozen or more cases. These patients are always relieved but are never physiologically cured. The operated side of the nose remains a *locus minoris resistentiæ*, always prone to more or less infecting disturbances, with the usual accompanying symptoms.

In conclusion, let me again state that operative procedures upon the ethmoid, unless slowly, carefully, and systematically carried out, are most apt to spell disappointment, and radical operations upon this structure do not by any means always end in radical cures.

PARTIAL THYROIDECTOMY.

By JAMES HARPER, M.A., M.B., Ch.B., Surgeon, Diseases of the Throat, Nose, and Ear, Royal Infirmary, Glasgow.

OPERATIONS on the thyroid body for the removal of growths and for the partial removal of the gland have been attended by certain recognised dangers. The most important of these are hæmorrhage at the time of operation and post-operative hæmorrhage. Shock to the patient, both at the time of operation and afterwards, is frequently marked, while the involvement of the recurrent laryngeal nerve, causing paralysis of the vocal cords, is a not infrequent occurrence. The Kocher operation, or some modification of it, is usually employed in dealing with these growths. The writer in this article describes a method which he has been using for some time, and which has invariably been successful in eliminating the recognised dangers attendant to the Kocher operation. Researches into the condition are at present being carried out, and this paper is merely a preliminary announcement, written in the hope that those interested in the subject may try this method. In a series of twenty cases of operation on the thyroid for the removal of thyroid growths of all sizes and of varying forms, the operator has never found it necessary to ligature an artery, and in no case has there been any post-operative hæmorrhage. Kocher recommends that the superior and inferior thyroid arteries should be ligatured, but the writer has found that this is unnecessary. Shock to the patient at the time of operation is practically non-existent, while in all the cases recovery has been uneventful. The recurrent laryngeal nerve has in no case been interfered with, and he believes that the risk of injury to this nerve is reduced to a minimum. Of the twenty cases upon which operation has been performed, in sixteen of them the growth was in the right lobe. Two of the cases, both in young men, were simple or parenchymatous goitre, consisting of a profuse overgrowth of the whole of the thyroid body, while in one case the growth was a small adenoma about the size of a hen's egg at the junction of the isthmus and the left lobe. One case was that of a rudimentary thyroid with the thyro-glossal duct still patent up to the level of the hyoid bone.

The operation is conducted as follows: an incision is made over the most prominent part of the growth from the anterior border of the sterno-mastoid muscle on the one side to the

Partial Thyroidectomy

sterno-mastoid muscle on the other. A slightly curved incision is employed, parallel with the lines of the neck. The platysma and deep fascia are divided, and the sterno-hyoid, sterno-thyroid, and omo-hyoid muscles are brought into view. It is frequently found that there is a communicating vein between the anterior jugulars. This vein is ligatured and cut across. The sterno-hyoid and sterno-thyroid muscles are divided, and the omo-hyoid muscle may be divided or pulled to the side. The capsule of the gland is now brought into view. In certain cases a plexus of veins is found radiating over the anterior surface of the capsule. These veins are secured with pressure forceps and are the only veins interfered with. A horizontal incision is now made through the capsule along the whole length of the isthmus. The forefinger of the right hand is then inserted through this incision in the capsule, and the gland separated from the capsule. The writer has made it a practice of removing the whole of the lobe of the thyroid along with the isthmus, where the growth has reached the size of a hen's egg, since he has found that in those cases where the growth has reached this dimension the lobe of the thyroid is also affected. He finds no difficulty in removing the thyroid in this manner with the forefinger, and in no case has he found it necessary to ligature an artery. The gland comes away easily from the capsule and arterial hæmorrhage does not occur. The sterno-mastoid muscle being pulled aside, the growth and the remainder of the lobe of the thyroid are brought out of the incision. At times, the isthmus is firmly adherent to the trachea, but it is gradually separated off the trachea with the forefinger. The isthmus is then cut across and the stump ligatured with a strong catgut suture, which is threaded through the substance of the gland. There is no bleeding when the isthmus is cut across, the ligature being applied to prevent the escape of thyroid secretion into the wound.

The writer considers that the principal point of the operation consists in removing the thyroid out of its capsule, using only the finger. No dissecting forceps, knife, or scissors are used, and it is to this fact that he attributes the total absence of arterial hæmorrhage. The veins on the capsule are now ligatured—usually only three ligatures are necessary. The deep fascia and the skin are stitched together, and a small amount of dry packing is left very loosely in the cavity and allowed to remain in for twenty-four hours. In no case has there been any post-operative hæmorrhage. At the end of twenty-four hours the packing is

James Harper

removed and a few inches inserted to act as a drain. This drain is changed daily for a week, at the end of which time a stitch is put in to completely close the wound.

A few of the typical cases are here appended :—

Mrs M'K., aged 35 years, consulted me on 11th March 1920 regarding a swelling in her neck, which had been gradually increasing in size for the past three years. She complained of difficulty in swallowing and shortness of breath, especially on lying down. There was a large growth, obviously cystic in character, in the right lobe of the thyroid. An operation was performed in the manner described above, and a large cyst, along with the remains of the right lobe of the thyroid which had atrophied and merely formed a thin covering to the cyst, was removed. The cyst measured $8\frac{1}{2}$ ins. by 9 ins. in circumference and was full of glairy fluid, while the cyst wall was very thick and tough. Recovery was uneventful.

Mrs C., aged 30 years, consulted me on 21st February 1920 regarding a gradual increase in the size of her neck, which she had noticed for the past five years. She became short of breath while walking about, but had no difficulty in breathing when lying down. The right lobe was removed with a large adenoma measuring $6\frac{1}{2}$ ins. by 7 ins. Recovery was uneventful.

Jeanie S., aged 43 years, consulted me on 3rd April 1920 regarding a swelling in her neck, which had been gradually increasing in size for the past three years. The swelling was confined to the right lobe of the thyroid. Her only symptom was that of feeling "choky" at times. At the operation the whole of the right lobe of the thyroid was found to be involved in the overgrowth. There was a protrusion into the neck behind the right clavicle. The right lobe and isthmus were removed, and recovery was uneventful.

Peter R., aged 16 years, consulted me on 21st June 1920 regarding a swelling in his neck. He had no symptoms relating to swallowing or breathing, but complained of great difficulty in wearing a collar. His neck measured 18 ins. in circumference. There was a symmetrical swelling of the whole of the thyroid, which had gradually increased in size during the past two years. The right lobe and isthmus were removed with some difficulty, owing to very firm adhesions, but there was no trouble from hæmorrhage, and recovery was uneventful. Examinations of sections showed a general subacute inflammation of the gland tissue. There were some areas where a notable increase in colloid material had occurred. Seen two months later the left lobe had contracted to its normal size.

Alexander C., aged 16 years, consulted me on 3rd August 1920 for a similar condition. He, however, complained in addition of difficulty

Partial Thyroidectomy

in breathing after exertion. The right lobe and isthmus were removed, and recovery was uneventful. Sections of the gland showed the swelling to be a true hypertrophy with not much increase in the colloid material.

Catherine C., aged 37 years, who consulted me on 23rd January 1920 complained of marked difficulty in swallowing and difficulty in breathing while in bed. She was very neurotic, with a slight degree of exophthalmos and with marked tremor of the hands. She complained of sleeplessness at night and of "seeing things" in a dark room. A small growth in the form of an adenoma about the size of a hen's egg which was present between the oesophagus and the trachea, was removed, along with the right lobe. Patient was very excited at night for two days, but was quieted with bromide. Otherwise recovery was uneventful. Seen on 18th June 1920 all symptoms had disappeared, the nervousness was gone, and she was feeling in very good health.

Mrs H., aged 32 years, consulted me on 1st October 1920 regarding a swelling in her neck, which was causing difficulty in breathing when she lay down at night. A large fibro-adenoma 7 ins. by $7\frac{1}{2}$ ins., along with the remains of the right lobe of the thyroid, was removed. The remains of the right lobe of the thyroid on being examined was found to be very cystic, these cysts being full of blood. Recovery was uneventful.

The writer hopes that by means of this short paper he may have stimulated the interest of others to try this method, since he has found it of great service in dealing with these conditions of the thyroid body.

Since the above paper was written, a number of similar cases have been operated upon with the same happy results.

CHORDITIS FIBRINOSA.

By A. BROWN KELLY, M.D., D.Sc., Glasgow.

II.

IN my paper on the above subject in the January number of this Journal, owing to an unfortunate oversight no reference was made to a contribution by Major Archer Ryland entitled "The Laryngeal Changes induced by Mustard Gas," which appeared also in this Journal in May 1919. The affection described in both papers is obviously the same, although the respective views on certain points are at variance. The discussion of these in my previous communication would have added to its interest and value. On this account and because of the seeming discourtesy to Major Ryland, I regret the omission and now beg to deal with the matter.

Ryland states that his paper is based on a large number of cases examined by him while laryngologist at the 73rd General Hospital. One reason given for publishing these observations is that he knows of no exact account of the changes that occur when mustard gas comes into contact with the larynx. He finds that the interval between the exposure to gas and the appearance of the lesion typical of the "gassed larynx" is very variable but, on an average, three days. Necrosis of the epithelial cells of the middle third of the true cords seems to result from the gassing. This localisation, he thinks, admits of a simple explanation, viz., the manner in which the true cords can be partly concealed by the movement downwards and backwards of the cushion of the epiglottis, and inwards and forwards of the arytenoids, and the approximation of the ventricular bands. That portion of the cord which remains unconcealed in this position of the larynx is that which undergoes necrotic change. On laryngoscopic examination both extremities of both cords are found to be red, while the mesial longitudinal halves of the middle thirds appear as smooth, slightly raised yellowish surfaces. The yellow fibrinous slough overlaps the mesial free edge and so interferes with vocalisation. In course of time the edge becomes less regular, and may assume a notched or serrated aspect. The yellow fibrinous slough clears up in a constant manner, namely, from without mesially until only a very narrow strip lies along the free edge

Chorditis Fibrinosa

of each middle third, leaving the area of cord from which it has receded a full pink colour. The appearance is now that of chronic simple laryngitis. Aphonia in the post-slough stage is due to myopathic paresis, is difficult to treat, and may last much longer than the phase of the typical lesion. While the slough persists all cases are detained in hospital and receive each, or every alternate day treatment by direct application to the cords. A weak solution of menthol in liquid paraffin has proved useful. As soon as the necrosed area clears up, the case is sent to a convalescent camp, and attention is paid to the general health and nasal breathing.

The above résumé of Ryland's paper shows that his observations of the laryngoscopic aspect and the course of development of the affection under consideration are in agreement with those of Fränkel, Seifert, and the writer. He regards all his cases as due to mustard gas, and does not refer to influenza as a possible cause, while Seifert, without mentioning gas, attributes all his cases, as did also Fränkel, to influenza. More than half of my patients (twenty-three out of forty) had been gassed, and only three had had influenza. I have no doubt as to the occurrence of chorditis fibrinosa apart from gassing, for ten of my patients developed this affection while on service in this country. Further, in my previous communication, I expressed the opinion that although in a considerable proportion of my cases of chorditis fibrinosa the men had been exposed to gas, the exudation on the cords in this affection was not solely or directly due to gas, for in other six cases when mustard gas had certainly affected the larynx, and sometimes also the pharynx, an entirely different picture was produced. Irregular patches of membrane were then found on the epiglottis, occasionally on the arytenoids and ary-epiglottic folds, and less often on the ventricular bands, but never on the true cords. Ryland may have met with such cases in his large material, but does not refer to them.

Ryland attributes the localisation of the deposit on the middle third of the cord to the exposure of this region to the gas, and the escape of the anterior and posterior extremities to their protection by the epiglottis and arytenoids. In my paper the view was advanced that the exudation formed on the vibrating part of the cord while the fixed extremities escaped. The writer believes that the latter theory better accounts for the fact that the original extent of the membrane may vary

A. Brown Kelly

considerably in different patients (p. 6), and for the manner in which the membrane clears up and is last seen at the middle of the ligamentous cord (p. 9).

Ryland's observations are thus a valuable contribution to the laryngoscopic appearances in chorditis fibrinosa; he shows that mustard gas may play an important part in the causation of the affection, and he offers a new explanation of the localisation of the fibrinous exudation.

A CONSERVATIVE TREATMENT OF CHRONIC MIDDLE EAR SUPPURATION.*

By ANDREW CAMPBELL, M.B., F.R.C.S. (Edin.), Honorary Ear, Nose, and Throat Surgeon to the North Riding Infirmary and North Ormesby Hospital, Middlesbrough.

THE conservative treatment of chronic middle ear suppuration, associated with the name of Bezold, is widely known on the Continent, where it is a routine practice in many clinics. Bezold was the first to use boric acid in the treatment of suppurating ears in 1879, shortly after Lord Lister had established its antiseptic properties. A full account of the treatment is given in the *Text-book of Otology* by Bezold and Siebenmann. The necessary apparatus consists of the following: (1) A rubber bag (valveless Politzer bag) connected by about three feet of tubing to (2) Intratympanic cannulæ—four or five shapes and sizes. These were first introduced by Arthur Hartmann. (3) Probes wrapped with cotton wool. Wooden probes are excellent. (4) Two powder blowers, one for boric acid and the other for a mixture of salicylic acid and boric acid in the proportion of 1 to 4. The salicylic acid is used in cases where there is cholesteatoma. (5) A Politzer bag.

The technique consists of five stages: (1) Intratympanic syringing with 4 per cent. boric lotion at body temperature. To obtain this temperature the bag is filled with lotion at 105° F., and, if used immediately, the lotion is at the correct temperature. An intratympanic cannula of suitable size and shape is attached to the tubing and introduced through the perforation into the middle ear, care being taken that all air has been expelled from the system. The noisy escape of air into the middle ear is most alarming to the patient, who may make some sudden movement with unlooked-for results. The bag is now compressed gradually by a nurse, and the accessible parts of the middle ear are washed out in the view of the operator. It is most important that the lotion should be at body temperature, as otherwise nystagmus and giddiness result. (2) The meatus and parts of the middle ear accessible

* Reports for the year 1919 from the Ear and Throat Department of the Royal Infirmary, Edinburgh, under the care of A. Logan Turner, M.D., F.R.C.S.E.

Andrew Campbell

through the perforation are dried by means of a probe and cotton wool. (3) The middle ear is politizerised so as to blow out any moisture which has escaped the drying. (4) A second and final drying, which must be very thorough. Malleable probes are of great value. (5) Powder all accessible parts of the middle ear and the outer surface of the tympanic membrane with a thin layer of boric acid. Where the perforation is small, the tympanum is not powdered. The powder may be blown through a dry intratympanic cannula in cases where the powder does not reach all parts. A small piece of cotton wool is inserted into the meatus. The treatment is repeated once daily; later, once every two days, and so on at longer intervals until the middle ear is dry as shown by the dry powder on examination. The treatment takes on an average from five to eight minutes for each patient.

Professor Nager of Zürich tells me that no serious complication has occurred in his clinic, where it is the only treatment adopted, nor has he heard of any fatalities. In nervous patients there is some difficulty at first, but it is surprising how quickly even very young children become tolerant to all intratympanic manipulations. This treatment should only be carried out by those who are accustomed to work in the ear, but there is no doubt that it is excellent training for ear work.

Bezold divides chronic suppurative otitis media into two great groups: (1) those with central perforations and (2) those with marginal perforations, in which are included perforations of Shrapnell's membrane, and total perforations. From the point of view of treatment the former are easy to cure and the latter more difficult, owing to the disease being more severe, less accessible, and often associated with cholesteatoma. The epithelium of the meatus easily grows through a marginal perforation to line bare areas in the middle ear in an attempt to bring about a natural cure. The successive shedding of this epithelium results in cholesteatoma.

RESULTS OF TREATMENT OF C.O.M.S. WITH CENTRAL PERFORATIONS.

Von Ruppert reports 93 per cent. cures, of which 75 per cent. were cured within one month, and some of them, with discharge for years, were cured after one syringing (Nager). By cure is meant cessation of discharge only for short or long periods.

Chronic Middle Ear Suppuration

In the series of cases detailed in this paper cure means something more definite. Bezold states: "Every circumscribed growth, be it ever so small, ought to be removed by means of a snare. I have never found a necessity for *other operative interferences* in chronic suppuration of the middle ear with *central perforation*, except in those extremely rare cases of general sepsis after acute recurrences." He reports, therefore, cure in all cases with central perforation by conservative means. This view is also held by Professor Nager. It must be mentioned here that anterior inferior central perforations are looked upon by them with much suspicion of being tubercular in origin. The claim as regards cure does not include tubercular cases.

RESULTS OF TREATMENT OF C.O.M.S. WITH MARGINAL PERFORATIONS.

Von Ruppert reports 90 per cent. cures. Professor Nager claims about 70 per cent. of cures, including cases with cholesteatoma. He thinks that the radical mastoid operation is not justified in these cases, until this treatment has failed "The first sign of improvement is shown by less fœtor, and shortly afterwards the discharge becomes less." Siebenmann is of opinion that if no improvement occurs in four to six weeks an operation should be done. Bezold writes: "Sometimes the suppuration remains fœtid in spite of careful treatment, continued for months, by means of the antrum tube and the removal of the polypus. . . . This state of affairs proves that the entrance to the cavity is inadequate, and that a part of it cannot be reached by the jet of the syringe. The indication is, therefore, to make the focus of the disease accessible by means of an operation." He recommends first, the removal of the malleus and if this fails a radical mastoid operation, except in those cases where the ossicles are apparently intact and there is good hearing when an attempt is made to save the ossicles (modified radical mastoid). Certain Continental otologists, therefore, hold that all chronic suppurations with central perforations can be cured by conservative means, and that an operation is not justifiable except when there is an acute exacerbation. They also hold that a very large proportion of chronic suppurations with marginal perforations can be cured, even where there is cholesteatoma, and only cases which resist Bezold's treatment should be operated on.

No. and Sex.	Age.	L. or R. Ear.	Duration of discharge.	Factor.	Perforation.	No. of Treatments and length in days.	Cholesteatoma washed out	Treatment Result.	Result in October 1919.	Length of Cure in years.	Operations, if any.	Remarks.
1. F.	43	Both	Several years	None	Marginal	36 in 104	None	Cure	Cure	3	None	Influenza in 1918.
2. F.	28	R.	Two years	Yes	Marginal	26 " 63	Yes, moderate	Cure	Cure	5½	None	Untreated ear discharges occasionally.
3. F.	24	L.	Childhood	Yes	Marginal	6 " 10	None	Cure	Cure	3½	None	Autogenous vaccine failed to cure.
4. M.	31	L.	Six months	No	Central	8 " 10	None	Cure	Cure	3½	None	R. Ear, C.O.M.S. meningitis, radical mastoid; operation, recovery.
5. F.	12	L.	One year	No	Marginal	33 " 60	Yes, much	Cure	Cure	4	Adenoids	
6. M.	18	R.	Childhood	No	Marginal	19 " 40	Yes, moderate	Cure	Cure	3½	None	Left labyrinth destroyed.
7. F.	13	Both	Five years	Yes	Shrapnell	43 " 87	Yes, much	Cure	Cure	3½	Polypus	Reported by letter.
8. M.	12	R.	Several years	No	Marginal	33 " 36	None	Cure	Cure (?)	Doubtful	None	Recurrence after swimming
9. F.	10	Both	Six years	No	Marginal	30 " 110	None	Cure	Recurrence	3	None	Recurrence after tonsillitis.
10. M.	19	R.	Childhood	Yes	Marginal	15 " 24	None	Cure	Recurrence	2	None	
11. M.	11	L.	Ten years	Yes	Marginal	21 " 62	None	Cure	Recurrence	3½	None	
12. M.	36	R.	Childhood	No note	Marginal	13 " 31	None	Cure	Recurrence	2	None	Recurrence after syringing for wax.
13. M.	32	L.	Ten years	Yes	Marginal	9 " 14	Yes, much	Cure	Recurrence	2½	None	
14. M.	14	L.	Five years	Yes	Marginal	10 " 25	Yes, moderate	Cure	No report	Doubtful	None	
15. M.	18	L.	Five years	Yes	Total	44 " 99	None	Incomplete	No report	..	Adenoids, polypus	
16. M.	48	L.	Ten years	Yes	Marginal	13 " 42	Yes, little	Incomplete	Discharge continuous	..	Polypus, later radical mastoid	Operation showed little disease. Probably been cured if treatment had been complete.
17. F.	18	R.	Four years	Yes	Marginal	35 " 57	Yes, much	Failure	..	..	Radical mastoid	Little improvement during treatment.
18. M.	23	L.	Ten years	Yes	Shrapnell	60 " 71	None	Failure	..	..	Polypus, later radical mastoid	Antrum and tympanum full of granulations.
19. M.	15	R.	One year	Yes	Total	78 " 114	None	Failure	..	..	Polypus, later radical mastoid	Cholesteatoma, extradural perianus abscess. Bezold's mastoiditis.

Chronic Middle Ear Suppuration

Early in 1914, Dr Logan Turner and Dr J. S. Fraser suggested that I should treat some of these cases in Edinburgh and demonstrate the results. *Only chronic cases, which resisted other methods, or cases which would as a matter of routine be entered for radical mastoid operation were selected.* Nineteen cases were treated, of which seven were completely cured; that is to say, there was no history of recurrence, nor any evidence of suppuration on the date of the last examination in October 1919—three to five years after treatment. Seven cases were free of discharge for two or three years after treatment, and on recurrence the *treatment was not available.* In two cases the treatment was not completed, but in both, the ears were almost dry when the treatment was suspended. One of these has not reported since, and the other was operated on (see No. 16). Four cases eventually came to operation, including the one incompletely treated. The findings at the operations are of interest, especially in the one incompletely treated case, which showed a sclerotic mastoid, deep antrum with no pus, no cholesteatoma; long process of incus gone, malleus healthy, polypus,—a case which most probably could have been cured if treatment had been completed. If we consider that the arrest of discharge by treatment is a cure, then out of seventeen completed cases fourteen were cured. If treatment had been available on recurrence, no doubt some of the cases would still be free of discharge. One case recurred after tonsillitis, one after syringing for wax, and another after swimming. Most of the cases showed marked early improvement, say within fourteen days. In the fourteen cured cases the average number of treatments was twenty-two, and the average time of treatment forty-one days. Polypus and cholesteatoma are not contraindications for conservative treatment, though the cases with polypus were longer in being cured owing to the granulations left after removal. Cauterising with chromic acid beads did not hasten healing. Removal by the curette seems preferable. The size of some of the masses of cholesteatoma washed out was surprising, apparently much larger than the perforation.

Great care was taken as regards the temperature of the lotion used in syringing. There was no mishap during the whole investigation. All manipulations were done under the control of the eye. This necessarily means that the organisms coming away with the lotion during the syringing may infect the surgeon unless a mask is worn. Bezold warns those under-

Andrew Campbell

taking this work of that possibility, and mentions that one or two of his assistants developed tuberculosis, possibly from this source.

Cases with central perforations may heal up quite well with syringing, drops, and drying thoroughly; a treatment which can be carried out by the patient and his family. When we come to persistent suppuration with marginal perforation, the result of this investigation may influence surgeons to try the Bezold treatment before advising the radical mastoid operation, which often involves a long and tedious after-treatment. The hearing also is seldom improved, especially when an epithelial graft is used, whereas in the conservative treatment a cure can be obtained in a large proportion of cases, with some improvement of hearing. It is noteworthy that in the three failures, which came to operation, the hearing distance was reduced in each. It would be interesting to try this treatment with a view to hastening recovery, in cases where a modified radical operation has been done.

My thanks are due to Dr Logan Turner for permission to treat his patients and to publish these results. The work was carried out in the Outpatient Clinic of the Ear and Throat Department in the Royal Infirmary, Edinburgh. The operations were performed by Dr J. S. Fraser, whose remarks have been quoted in two cases. I thank Dr Fraser for his interest in this treatment and for his advice on many occasions. I am much indebted to Professor Nager of Zürich, who pointed out the excellent results obtained by the Bezold School, and taught me the technique of this treatment.

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CLINICAL RECORD

"LATENT" THROMBOSIS OF THE LATERAL SINUS.

By DOUGLAS GUTHRIE, M.D., F.R.C.S.

THE intracranial complications of middle ear suppuration are seldom diagnosed in their earliest stages. Too frequently the patient is not referred to the otologist until the disease is far advanced, the diagnosis obvious, and the prognosis almost hopeless. Early diagnosis, while greatly to be desired, is nevertheless fraught with many difficulties. A case in which the onset and development of lateral sinus thrombosis was observed, and in which the signs and symptoms were so few and vague that the term "latent" might be applied to the case, is here briefly recorded.

G. C., aged 45, had been dull of hearing in the left ear for about fifteen years, but there had been no discharge until three weeks before examination, when a bad odour was detected and pus was found on the pillow. There was no complaint of headache, giddiness, or aural pain. The left ear contained pus, and a polypus blocked the meatus. The right drum-head was normal. Whisper could be heard at 4 inches from the left ear, 8 feet from the right ear. Both labyrinths were active (turning-chair).

It was decided to remove the aural polypus and then try the effect of conservative treatment. This operation was deferred, however, on account of an illness which the doctor regarded as influenza. The patient was in bed for a week, with a temperature which at one time reached 103° F., but he did not feel ill, and his only symptom was *pain in the left tonsil on swallowing*.

A fortnight later he was admitted to a nursing home, and the aural polypus was removed by snaring. It appeared to originate from the upper edge of the tympanic ring.

On the same evening the temperature rose to 104, returning to normal within a few hours, the fall being accompanied by profuse perspiration.

During the next few days there was a rise of temperature each afternoon to 101 or 102°, followed by a return to normal during the night or early next morning. The fall of temperature was always accompanied by profuse perspiration. As several doses of aspirin had been given on the assumption that the fever was of influenzal nature, the perspiration was attributed to the action of this drug. The

Douglas Guthrie

discharge from the ear, under treatment by spirit drops, was slight, there was no headache or tenderness, and indeed the patient felt fairly well. At no time was there any rigor. A physician, who saw the case in consultation, confirmed the diagnosis of influenza and suggested the use of quinine. Nevertheless the daily rise of temperature continued, and on the seventh day after removal of the polypus the fever was higher than before, rising to 103, and the patient complained for the first time of sore throat, limited to the region of the left tonsil. The pain, he said, was not severe, but was aggravated by swallowing, just as it had been during the attack of "influenza" prior to the operation. The pharynx appeared normal, but there was slight tenderness on pressure at a point just behind the angle of the left jaw. There was no pain in the ear, and only slight frontal headache. It was now resolved to explore the mastoid antrum and lateral sinus.

Operation, 20th March 1920.—The bone was sclerotic, and the mastoid antrum contained granulations and pus. A radical operation was performed. The lateral sinus was exposed and found to be covered by granulations. On incising it, a clot was at once extruded, and free bleeding took place from either end of the vessel. The jugular vein was now ligatured above the common facial, and its upper part brought into the wound in the neck.

After the operation, the temperature remained normal or sub-normal, and steady recovery followed. The perspiration, however, continued profusely each evening for ten days, when it gradually diminished and ceased. Its distribution was peculiar, as it was confined to the side of the lesion, and affected chiefly the left side of the head and neck and the left arm and shoulder. There was no dilatation of the pupil and no alteration (motor or sensory) of the palate. The patient left the home three weeks after the operation, with mastoid and neck wounds both healed. Four months later the ear was quite dry and the bone cavity lined with epithelium. Conversational voice could be heard with the left ear at 4 feet. The patient felt better than he had been for some years and had gained half a stone in weight.

SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY

May 16, 1919.

President—Mr HUGH E. JONES.

ABRIDGED REPORT.

Ossiculectomy in Chronic Adhesive Process, by Dr P. WATSON-WILLIAMS.—Female, aged 26. Deafness for several years. L.M.T. thickened and retracted (malleus immobile). Rinne negative. Gellé positive, therefore stapedio-vestibular joint not ankylosed. Whisper, right 28 inches, left 20 inches; after catheterisation, right 54 inches, left 36 inches. Sphenoidal sinus found infected and opened. Tonsils enucleated. Crucial myringotomy: lower half of the malleus handle removed (left ear). Whisper after operation, 24 feet. Patient shown 17th November 1916, and opinion expressed by some members that the improvement was in part due to suppuration and would not persist. Now, two and a half years after the operation, the beneficial effect on the hearing remains. The ear has remained dry for over a year. Whisper, right 5½ feet, left 25 feet.

DISCUSSION.

THE PRESIDENT, Dr H. J. BANKS-DAVIS, Dr DUNDAS GRANT, Mr CLAYTON FOX, Mr HUNTER TOD, and Dr KELSON took part.

Circumscribed Labyrinthitis, by Mr J. F. O'MALLEY.—Male, aged 35. Partially deaf since four years of age. C.O.M.S. bilateral. Admitted 10th August 1910 for severe vertigo. Vomiting. Nystagmus to left. Temperature normal. He was able to get up in ten days. Examination shows granulation tissue in the posterior attic. Whisper not heard close to ear. On cold caloric test nystagmus induced after two and a half minutes. Fistula symptom not elicited.

DISCUSSION.

Mr C. E. WEST, Mr SYDNEY SCOTT, and the PRESIDENT advised that operative treatment should be limited to the middle ear.

Labyrinthectomy, by Mr J. F. O'MALLEY.—Female, aged 27, complained of severe giddiness. Total loss of right membrane and malleus. No pus present. Hearing almost extinct. At radical

Societies' Proceedings

mastoid operation, fistula in the external canal. Later, double vestibulotomy and opening of cochlea. Patient now able to work again.

DISCUSSION.

Mr LAWSON WHALE, Mr C. E. WEST, and Mr SYDNEY SCOTT took part.

Two Cases of Fracture of the Base followed by Otitis Media, Meningitis, and Death.—Mr J. S. FRASER.

CASE I.—Male, aged 44. Two days before admission, as he was going home under the influence of alcohol, he slipped and fell on the pavement, striking the right side of his head. He was not unconscious after the accident, but there was bleeding from the right ear and also from the mouth. After the accident the patient suffered from severe vertical headache. On admission he felt as if he were rotating from left to right about a vertical axis. The right ear has been quite deaf since the accident. He has felt sick but has not vomited. *Examination*—Watery discharge from right ear. R.M.T. red and bulging. Complete deafness. Weber lateralised to good ear. Spontaneous nystagmus to left (sound side) of second degree. Patient tends to fall to right and shows a pointing error to right. No facial paralysis. Temperature 101° F., rose to 103° F. Kernig's sign absent. *Lumbar puncture*—c.s. fluid, blood-stained but not under pressure. Two days later patient very ill. Severe headache and backache. Temperature 105° , pulse only 72. Kernig's sign present. Slight facial paralysis on right side. Second lumbar puncture: fluid under great tension, polymorphs greatly increased. *Post-mortem*—Blood present over vertex in subdural space and also in the right temporal region. At the base purulent leptomeningitis was present over the pons, medulla, and lower surface of cerebellum. Laceration of left temporo-sphenoidal lobe. The right temporal bone showed a stellate fracture involving both petrous and squamous portions.

Microscopic Examination.—External auditory meatus shows fracture of the anterior wall (Fig. 1). R.M.T. is generally thickened and ruptured below and behind the handle of the malleus. The outer wall of the Eustachian tube is fractured. There is a fracture through the roof and floor of the tympanum. There is hæmorrhage in the outer part of the attic, and in the lower part of the tympanum posteriorly; the exudate is purulent. The stapes shows at least two fractures. The malleus and incus are not involved. The fracture goes through the facial canal above the oval window and passes through the upper margin of the window. There is also a fracture of the region of the round window. One can trace the

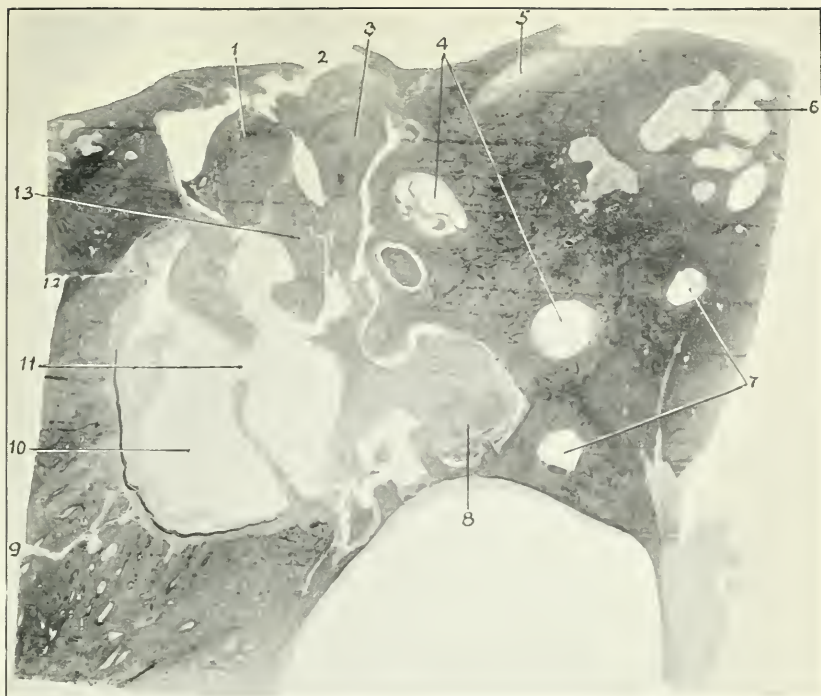


FIG. I. (*Case I*).—VERTICAL SECTION. ($\cdot 6$ diam.).—1. Malleus. 2. Fracture. 3. Exudate. 4. Lateral canal. 5. Superior canal. 6. Air cell. 7. Posterior canal. 8. Sinus tympani. 9 and 12. Fracture of anterior meatal wall. 10. External meatus. 11. Perforation. 13. Incus.



FIG. II. (*Case I*).—1. Fracture. 2. Exudate in vestibule. 3. Fracture of bony spiral lamina. 4. Scala tympani. 5. Fracture of tympanic floor. 6. Exudate in tympanum. 7. Perforation of drumhead. 8. Fracture of meatal wall.

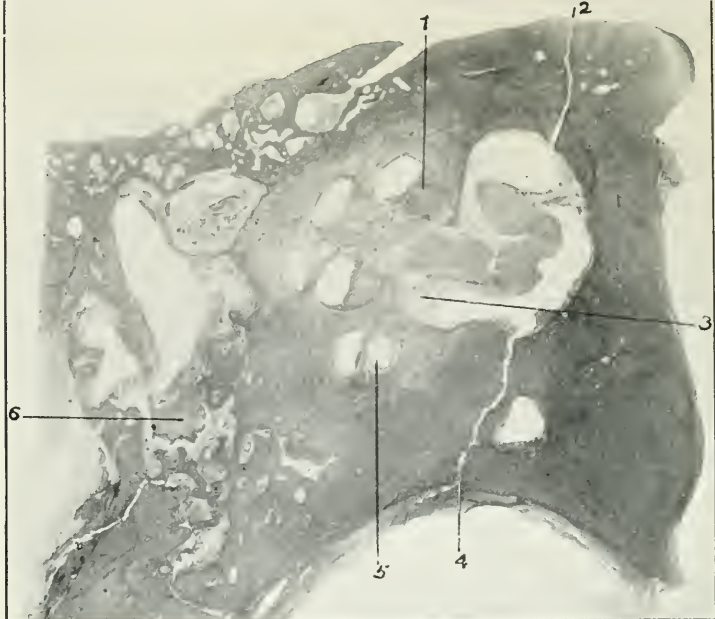


FIG. III. (*Case I*).—1. Scala tympani of basal coil filled with hæmorrhages. 2. Fracture. 3. Cochlear nerve. 4. Lower end of fractures. 5. Basal coil. 6. Exudate in tubal part of tympanum.

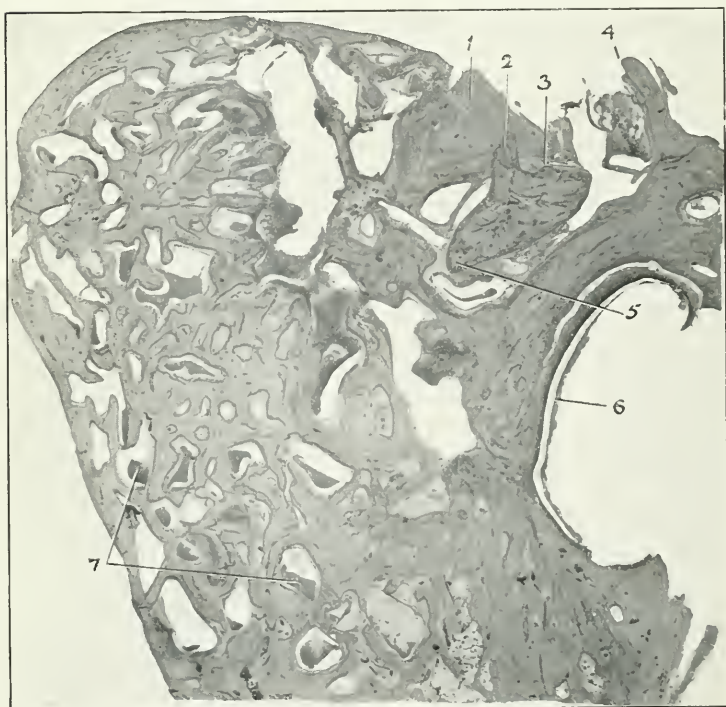


FIG. IV. (*Case II*).—VERTICAL SECTION. ($\times 6$ diam.).—1. Connective tissue in gap left by old fracture. 2. Long process of incus. 3. Articular surface. 4. Edge of fracture. 5. Short process of incus, which has retained its attachment to floor of aditus. 6. External meatus. 7. Air cells with exudate.

Royal Society of Medicine

continuity of the exudate in the niche of the round window with that in the scala tympani. *Cochlea*—Only the intra-vestibular portion of the cochlea is fractured. There is hæmorrhage in the spiral ligament. Corti's organ is unrecognisable. All three scalæ contain exudate, but the scala tympani shows much more than the others. *Vestibule*—The fracture runs into the roof of the vestibule and then downwards through the bony spiral lamina and the region of the round window into the tympanic cavity, and finally passes through the roof of the jugular bulb (Fig. 2). The vestibule itself is filled with hæmorrhage. The tip of the promontory is almost chipped off. *Canals*—There is no fracture of the labyrinth capsule in this region, but the lateral canal contains pus and blood. The other canals are more normal. *Internal meatus*—The fracture extends right through from the floor of the middle fossa, through the bony roof and floor of the meatus, to the region of the opening of the aqueduct of the cochlea. Some cellular exudate is present in the fundus of the internal meatus (Fig. 3).

CASE II.—Male, aged 6, suffered from fracture of base of skull in August 1913, with bleeding from right ear. He recovered and remained well for one year, till 30th August 1914, when, after a severe cold, earache (right) and headache came on. 31st August 1914—Vomiting, unconsciousness, jerking of right arm, rigidity of neck, Kernig doubtful, temperature 101° F., pulse 110. 1st September 1920—Death. *Post-mortem* (five and a half hours after death)—Flattening of convolutions. Cerebro-spinal fluid increased and turbid: exudate in interpeduncular space. Sphenoid and ethmoid healthy. Left middle ear contained turbid fluid. Old fracture of roof of right mastoid antrum.

Microscopic Examination of Right Ear.—The mastoid cells are full of pus. There is a gap in the roof of the mastoid antrum filled with fibrous tissue (Fig. 4), and there is a piece of bone lying loose in the midst of this fibrous tissue, with pus around it. The piece of bone proves to be the incus, which had become dislocated backwards into the mastoid antrum. From the appearance of the well-formed fibrous tissue surrounding the incus it is evident that this is an old dislocation. What appears to have happened is that the incus became dislocated backwards at the time of the fracture in 1913, retaining its attachment to the floor of the aditus, and at the same time there was a fracture of the roof of the antrum. The patient recovered at the time as no infection occurred, but one year later when he developed an acute suppurative otitis media the infection passed by way of the tympanic cavity, the aditus and antrum, through the old gap to the intracranial structures, and the result was purulent leptomeningitis and death. The lining

Societies' Proceedings

membrane of the Eustachian tube is very vascular and swollen, and the submucosa is infiltrated with pus cells. The tympanic cavity is full of pus. The footplate of the stapes is quite normal. The long process of the incus has been broken. The head of the malleus is ankylosed to the new bone which has been formed in the roof of the middle ear (Fig. 5). *Cochlea*—There are many white cells in the scala tympani in the basal coil, but the pus does not extend as far as the helicotrema. There is some infiltration of pus cells from the internal meatus into the spiral ganglion of the basal coil. Corti's organ is normal. The vestibule and canals are healthy. *Internal meatus*—There are many pus cells in the internal meatus within the arachnoid sheath.

Otosclerosis Associated with Otitis Media, by Mr J. S. FRASER.—Male, aged 27, had chronic middle ear suppuration on the left side for ten years. Ten days before admission the wound ceased to discharge, and three days later the patient began to have occipital and frontal headache. For one week there has been facial paralysis on left side. Four days before admission vomiting commenced and has continued. Of late, the patient has complained of giddiness on getting out of bed, and has tended to fall to the left side. *Examination*—*The right drumhead shows a large retracted scar.* The left external meatus contains foetid pus and granulations. *Cochlear apparatus*—Schwabach lengthened; Weber lateralised to right (better) ear; Rinne absolutely negative on left side. On the right side Rinne is *said to be positive*. (This test was not carried out by Dr Turner or the writer.) With the noise apparatus in the right ear patient is quite deaf. *Vestibular apparatus*—Patient falls to the left, and the direction of the fall is not altered by changing the position of the head. Slight spontaneous nystagmus to the right, and slow, coarse rotatory nystagmus to the left; pointing error to right in both upper extremities. Cold syringing of left ear produced no change in the spontaneous nystagmus in one and a half minutes. *General condition*—Temperature 98.4° F., pulse 88. Patient lies curled up on the left (diseased) side. Patient is bright mentally. "Finger nose" test more accurately performed on right side than on left side. Dysdiadokokinesia well marked on left side. Grasp of both hands good.

Operation.—Track of pus extending from the mastoid surface to the antrum, which was full of cholesteatoma. Fistula from antrum through posterior wall of meatus. Sinus wall normal. Fistula present in lateral canal. Facial nerve lying uncovered by bone above oval window. Roof of tympanum and antrum healthy. Dense, healthy bone present in triangular area. Posterior canal opened up (Neumann's operation); promontory also removed. Cerebellum

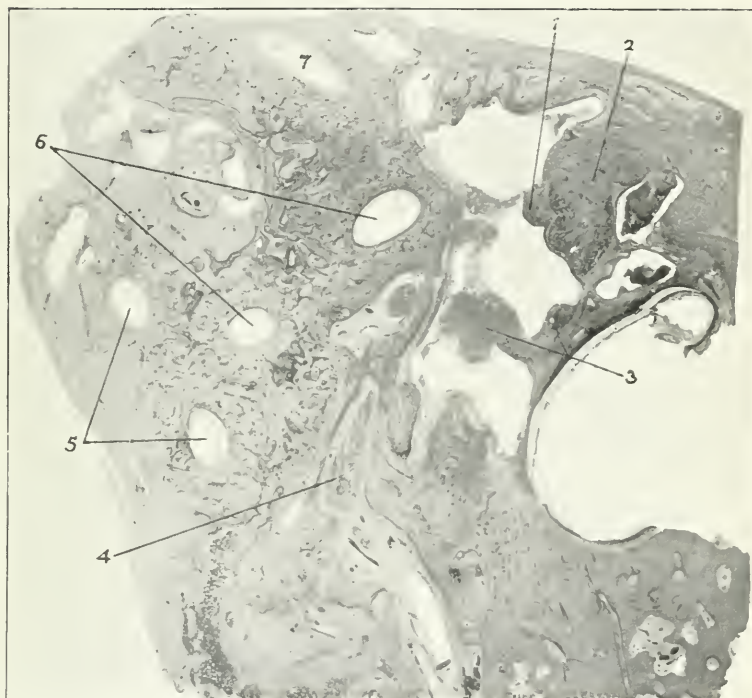


FIG. V. (*Case II.*)—1. Position which should be occupied by body of incus. 2. Malleus. 3. Exudate in tympanum. 4. Stapedius. 5. Posterior canal. 6. Lateral canal. 7. Superior canal.



FIG. VI.—OTOSCLEROSIS ASSOCIATED WITH OTITIS MEDIA. VERTICAL SECTION OF RIGHT EAR. ($\times 35$ diam.).

1. Upper edge of otosclerotic area. 2. Footplate of stapes not ankylosed.
3. Intravestibular part of cochlea. 4. Lower margin of diseased area.
5. Thickened periosteum.

Royal Society of Medicine

explored with negative result. *Progress*—Vomiting, restlessness, Kernig's sign, meningitic cry. Lumbar puncture fluid showed excess of albumen and many polymorphs. Cerebellum again explored with negative result. Death three days after operation. *Post-mortem*—Basal meningitis. Cerebellar abscess, the size of a walnut, in anterior part of the left lobe further forward than the exploratory opening (although this had been made in front of the sigmoid sinus). The abscess abuts closely on the fourth ventricle, but no communication is visible. The ventricles of the brain contain slightly turbid fluid.

Microscopical Examination of Right Ear (chronic adhesive process and otosclerosis).—There is a large retracted scar in the drumhead adherent to the promontory. Practically no tympanic cavity remains. The attic is filled with delicate, connective tissue. The aditus is obliterated by new connective tissue. The stapes is present, embedded in granulation tissue but is not ankylosed. An area of otosclerosis (osteitis vasculosa) is seen just above the basal coil of the cochlea in the anterior margin of the oval window (Fig. 6). Some giant cells are present in the large vascular spaces of the new bone formation. The focus of spongy bone reaches the endosteum of the vestibule just above the intravestibular part of the cochlea, and new vascular bone bulges into the vestibule (endostosis).

This specimen shows that Lucae was right when he said that it was impossible to distinguish between a chronic adhesive process and otosclerosis, *i.e.*, that the one condition ran into the other.

Microscopical Examination of Left Ear.—Allowing for the fact that double vestibulotomy had been performed on this side, the left ear showed the same changes as those present on the right side (Fig. 7).

Otosclerosis associated with Fragilitas Ossium and Blue Sclerotics, by Mr J. S. FRASER.—Dr Edith Bronson has published an article dealing with the Currie family (*Ed. Med. Journ.*, April 1917). The grandfather, William Currie, was deaf, had had many fractures and his sclerotics were deep blue. He had six children, all girls. Three of these suffer from the same conditions (one examined, Case I.). One other has fragilitas ossium and blue sclerotics, but is not deaf, while the two remaining daughters are normal. The third generation consists of twenty-four children. Two examined (Cases II. and III.), both of whom were daughters of the eldest child of William Currie. Four others show blue sclerotics and fragilitas ossium, though only one is deaf (Fig. 8, Chart I.)

CASE I.—Female, aged 49, has had over forty fractures and has blue sclerotics. Deafness started eight years ago. Tinnitus present. She hears better in a noise. Redness of promontory seen through

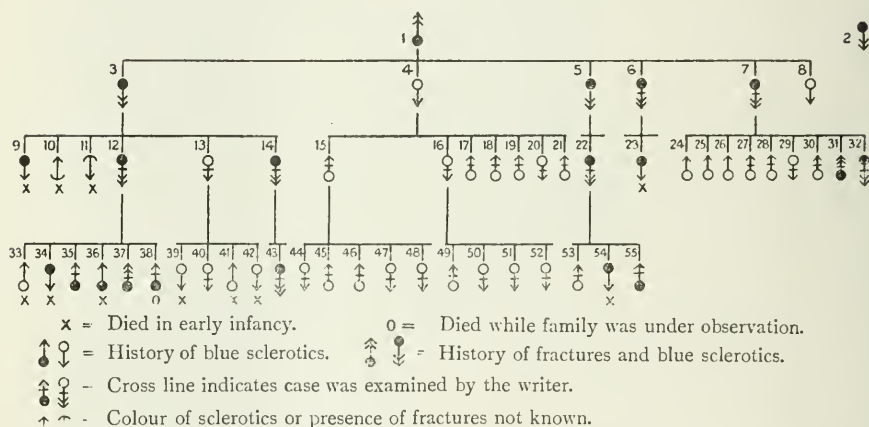
Societies' Proceedings

drumheads. Functional examination shows Bezold's symptom triad and also some nerve deafness. Cases II. and III. similar. Dizziness present in Case III.

All these conditions have been attributed to hereditary inferiority of the mesenchyme, from which the skeleton, including the labyrinth capsule and the sclerotics are formed. The association of otosclerosis with defects of the mesenchymatous structures appears to be of great importance. Just as the fragile bone requires the application of some force before it breaks, so the defective labyrinth capsule

FIG. VIII.

CHART 1.-THE CURRIE FAMILY.



55 individuals in this family. 35 of these examined by the writer. 21 of the 55 have blue sclerotics. Of these 21, 13 had fractures, 6 died in infancy without fractures, 1 is at present an infant, and 1 is a healthy boy of six years with no fractures.

Deafness present in Cases 1, 3, 6, 7, 12, 14, and 22. Only Cases 6, 12, and 14 were examined.

(By kind permission of the "Edinburgh Medical Journal.")

requires some infective agent before otosclerosis develops. There is much too great a tendency to attribute otosclerosis to one single cause alone, e.g., heredity, disorders of the endocrine gland system, toxin absorption, otitis media, or to a weakening of nerve influence. It seems quite likely that several or all of these causes may be combined. No one can deny that heredity plays an extremely important rôle. But, on the other hand, there are undoubtedly many cases in which no family history of deafness can be obtained. Our knowledge of the endocrine glands is at present too vague for us to be able to dogmatise on these subjects. Gray holds that toxæmia plays an important part in the production of otosclerosis. Loss of

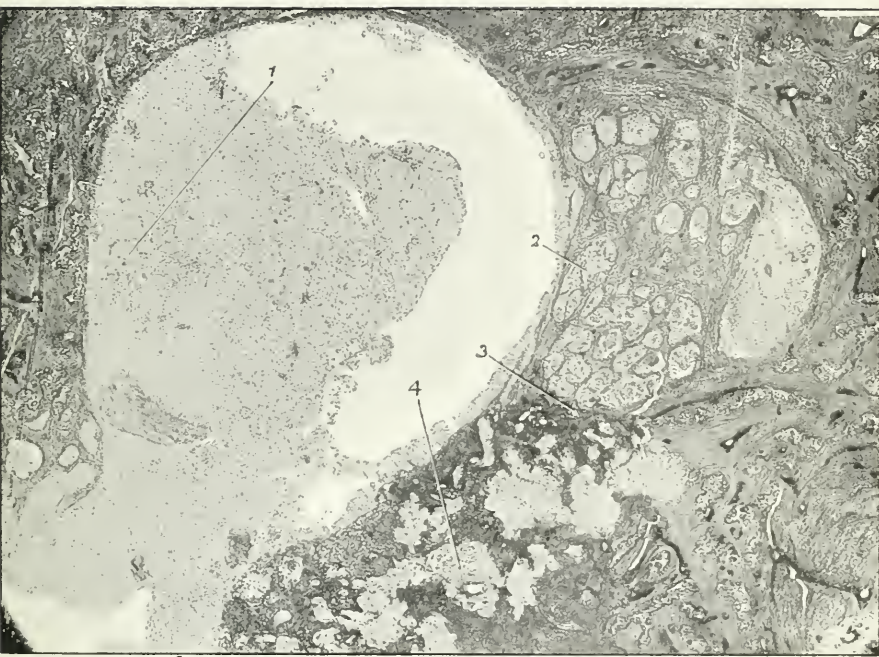


FIG. VII.—OTOSCLEROSIS AND OTITIS MEDIA. VERTICAL SECTION OF LEFT EAR.
($\times 35$ diam.)

- 1. Purulent exudate in vestibule. 2. Vestibular nerve. 3. Upper end of otosclerotic area.
- 4. Acute inflammatory infiltration in vascular space.

Royal Society of Medicine

nerve influence has been put forward by some as a most important factor in the production of the disease. The female sex is specially affected by such conditions as osteomalacia, fragilitas ossium, and otosclerosis. Pregnancy and the puerperium have a very prejudicial effect on the last of these conditions. The question of the importance of otitis media is much disputed. I hold that an attack of otitis media may be compared to "the match which fires the magazine." The hereditary tendency corresponds to "the powder." The female sex may also come under the heading of "inflammatory material." The loss of nerve influence and disorders of the ductless glands, which preside over the processes of bone formation and repair, may be compared to "a want of water with which to extinguish the flames."

DISCUSSION.

Dr ALBERT GRAY and Mr SYDNEY SCOTT took part.

SECTION OF LARYNGOLOGY

April 4, 1919.

President, Dr JAMES DONELAN.

Radiograms showing Absence of the Right Frontal Sinus, by Dr A. J. HUTCHISON.—The interesting clinical point in this case was the severe pain complained of by the patient in the right frontal region. After removal of polypi and the middle turbinal from the left side of the nose, the pain on the right side disappeared.

Pituitary Tumour removed by the Nasal Route, by Mr H. LAWSON WHALE.—The left nasal cavity was opened through an external incision, the left sphenoidal sinus was opened freely and the tumour, an endothelioma, was curetted. There was very little bleeding and pressure symptoms were relieved.

Patient after removal of Epithelioma of the Left Tonsil by Diathermy, by Mr FRANK ROSE.—Male, aged 67. Two years and nine months had elapsed since the operation and no recurrence was visible, but an ulcer on the right tonsil and a hard gland on the right side of the neck were detected.

Dr Douglas Harmer pointed out that there was not the same rapid recurrence after removal by diathermy as by the knife.

Removal by the Indirect Method of a Jagged Piece of Bone impacted in the Œsophagus, by Dr W. JOBSON HORNE.—The specimen was shown in order to call attention to the growing tendency to substitute the direct methods of operating for the older indirect procedure. There were cases such as this in which the foreign

Societies' Proceedings

body could be easily removed without subjecting the patient to the discomfort and even risk of suspension laryngoscopy and endoscopy.

Case of Naso-pharyngeal Angeio-Fibroma in a boy aged 13½, by Dr G. W. DAWSON.—After preliminary laryngotomy the tumour was removed partly by way of the mouth and partly by the nose. It had recurred. In the discussion reference was made to the value of radium as a method of treatment and to the use of Crile's carotid clamps during the operation of removal.

Four Cases of Atrophic Rhinitis with Ozæna, undergoing treatment by the glycophilic method were shown by Dr C. H. Hayton (see *Journ. Laryngology*, Sept. 1919, p. 365). In all, fœtor had disappeared and crusting had diminished.

SECTIONS OF OPHTHALMOLOGY AND LARYNGOLOGY

April 2, 1919.

President—Mr W. T. HOLMES SPICER.

Discussion on Injuries and Inflammatory Diseases affecting the Orbit and Accessory Sinuses.

After some introductory remarks by the President, Mr L. V. CARGILL, F.R.C.S., opened the discussion. After referring to the anatomical relations which existed between the accessory sinuses and the orbit, he pointed out that ophthalmic complications of sinus inflammation might present themselves as functional disturbances, toxic effects, or orbital inflammations the result of direct extension. Ocular complications were numerous: contraction of visual field, central scotoma, enlargement of the blind spot, retrobulbar neuritis, papilloedema and papillitis; more rarely, uveitis and episcleritis, subretinal effusion, retinal hæmorrhage and detachment. The orbital complications consisted in subperiosteal inflammation and abscess, usually with necrosis and perforation of the bony walls, and to a lesser extent, retrobulbar inflammation due to trauma, metastasis, or septicæmia.

Orbital inflammations at the Royal Eye Hospital constituted .5 per cent. of the total admissions, and the age of the patients varied from 11 months to 68 years: the males were as three to two of the females. The ethmoidal cells were the most frequent cause, then the frontal and maxillary sinuses.

Treatment should be by free incision and separation of the periosteum and the establishment of good drainage from the affected sinus.

Royal Society of Medicine

He dealt next, at some length, with the subject of injuries to the orbits and accessory sinuses, illustrating his remarks by experience gained during the war.

Mr G. SECCOMBE HETT dealt with war injuries, insisting upon the principle of free drainage together with the retention of any loose skin flap or portions of conjunctival mucous membrane and the removal of foreign bodies, sequestra, damaged turbinals, and septum. Subsequent plastic operations and the grafting of cartilage helped to restore the face.

Mr ARTHUR W. ORMOND'S remarks dealt mainly with the war injuries affecting the sinuses.

Mr E. D. D. DAVIS summarised twenty-two cases sent to him by ophthalmic surgeons for nasal examination. In all of them there was loss of sight as a result of retro-bulbar or optic neuritis. Three were due to suppuration of the ethmoid and sphenoid of long duration: in fourteen the nose was absolutely normal and the cause was not determined, while four were syphilitic and one of doubtful origin. The charts of the field of vision, though insufficient in number to be conclusive, suggested that the outer fibres of the optic nerve were affected in cases of nasal origin, and that all the fibres of the nerve were involved in idiopathic retro-bulbar neuritis cases.

Mr H. D. GILLIES was of the opinion that in war injuries of the sinuses, the external route for drainage was to be preferred.

Mr D. LEIGHTON DAVIES referred specially to the possibility of a latent chronic sinus infection when there was irido-cyclitis and choroiditis. Disturbances in vision were rarely very severe in sinus affections. Disturbances of accommodation in young adults, when there was no error of refraction, demanded a careful examination of the sinuses.

Mr W. M. MOLLISON pointed out that cases of orbital cellulitis almost invariably were due to sinus suppuration, but there were exceptions.

Mr J. F. O'MALLEY dealt with war injuries of the sinuses and lachrymal apparatus.

Mr G. H. POOLEY (Sheffield), referring to defective vision due to nasal conditions, considered it to be caused either by pressure on the optic nerve or to toxic influences on the retinal cells. When a toxin had been the cause, he had seen marked improvement after an operation on the nose.

Mr E. H. E. STACK (Bristol) spoke upon the treatment of injuries.

Mr W. STUART-LOW referred to the relief obtained in acute inflammatory conditions of the frontal sinus associated with cedema of

Societies' Proceedings

the upper eyelid, by packing round the swollen middle turbinal with cocaine and adrenalin. On removal of the plugs there was escape of pus and relief. The suction method of evacuating the sinus was also useful.

Mr HERBERT TILLEY emphasised the necessity of keeping in mind the fact that orbital cellulitis may arise in children secondary to sinus suppuration. Well-developed ethmoidal and sphenoidal sinuses may be present at the age of three years.

Mr H. LAWSON WHALE quoted some cases of injury.

SECTION OF LARYNGOLOGY

Summer Congress, May 2-3, 1919.

The President, Dr JAMES DONELAN, read a paper on **Some Suggested Alternatives to Operation for Adenoids and Enlarged Tonsils in Young Children** (*Journal of Laryngology*, July 1919, p. 229).

Dr WATSON WILLIAMS remarked that many of those cases suffer from infection of the nasal sinuses.

Sir WILLIAM MILLIGAN had made careful trial of thyroid extract, without effect. He deplored the fact that removal of adenoids was so often regarded as a simple operation.

Other members spoke, and were agreed that too much time should not be wasted in breathing exercises and paints. The snuff treatment must be condemned. Dental sepsis should receive attention.

Dr WATSON WILLIAMS contributed a paper on **Latent Sinusitis in Relation to Systemic Infections** (*Journal of Laryngology*, July 1919, p. 233).

Mr O'MALLEY quoted a case of rheumatoid arthritis, in which the pain disappeared after ethmoidal suppuration had been treated.

Colonel SHARP had a similar case cured by drainage of the sphenoidal sinus.

Dr BATTY SHAW stated that rheumatoid arthritis was an infective disease, and one must examine carefully for every possible source of infection.

A paper on **A Method of treating Atrophic Rhinitis, with Ozoena** (*Journal of Laryngology*, Sept. 1919, p. 365) was read by Drs T. H. C. BENAIRS and C. H. HAYTON.

Mr H. A. WORTHINGTON said that further investigation of the normal bacterial flora of the nose seemed desirable.

Royal Society of Medicine

Dr WILLIAM HILL had explored the nasal sinuses in some cases of ozæna, but never found infection or crusting. The immunity of the sinuses from disease which affected the contiguous nasal cavities was remarkable.

Mr TILLEY supposed that the infection of the mucous membrane in ozæna was a superficial one. The most satisfactory treatment is packing the nose several times a week with a strip of gauze soaked in glycerine.

Sir WILLIAM MILLIGAN had used glycerine treatment for years, but had not been able to explain why it was effective. The paper just read offered the explanation.

Dr SYME made a practice of operating upon the antrum in early cases of atrophic rhinitis, as the disease was, at its commencement, hypertrophic.

Dr WATSON WILLIAMS said that the terms Ozæna and Atrophic Rhinitis were not interchangeable.

Papers were also read by Dr A. BROWN KELLY on **Spasm at the Entrance to the Œsophagus** (*Journal of Laryngology*, Aug. 1919, p. 285) and by Dr D. R. PATERSON on **A Clinical Type of Dysphagia** (*Journal of Laryngology*, Aug. 1919, p. 289).

Dr DE HAVILLAND HALL referred to two men who were addicted to morphia and who, on giving up the drug, suffered from dysphagia.

Sir WILLIAM MILLIGAN said that in all middle-aged people who suffer from dysphagia a direct examination of the Œsophagus should be made. The symptom may be a passing phase or it may be the commencement of organic disease. How many of those cases of spasmodic dysphagia eventually develop malignancy?

Dr WILLIAM HILL would not admit the possibility of primary spasm of the lower pharynx, but thought that there was a condition, not of spasm, but of paresis in those cases of functional dysphagia. The patient made no effort to swallow and the forward and upward movement of the larynx did not take place. We should separate those cases of slight narrowing due to inflammatory and other organic causes from the smaller group which are of functional origin and are paretic rather than spasmodic neuroses.

Mr R. A. WORTHINGTON made it a rule never to pass a bougie until an endoscopic examination had been carried out.

Dr DAN MACKENZIE, in a short paper, described **An Operation for the Complete Removal of the Soft Palate** by means of the diathermy knife and cold wire snare.

Societies' Proceedings

A paper on **Gunshot Wounds of the Nasal Accessory Sinuses** (*Journal of Laryngology*, Sept. 1917, p. 333) was read by Mr J. F. O'MALLEY.

Mr HOWARTH said that free drainage was important in such cases, and the frontal sinus was the most difficult to treat.

Dr PATERSON mentioned the question of hæmorrhage, and described a case of gunshot wound of upper jaw in which ligature of the external carotid was required.

Mr O'MALLEY (in reply) was opposed to irrigation of the antra in gunshot wounds, as the natural protective mechanism was thereby destroyed.

Dr IRWIN MOORE read a paper on **The Treatment of Enlarged or Diseased Tonsils in Cases where Surgical Procedures were contra-indicated** (*Journal of Laryngology*, Oct. 1919, p. 387).

Dr DONELAN preferred the electrocautery to caustic paste.

Dr DUNDAS GRANT was of opinion that the ideal operation was to remove all the interior of the tonsil by punch forceps, leaving the capsule intact.

Dr WM. HILL regarded partial tonsillectomy as sufficient in singers.

Mr ROSE had no experience of caustic paste but had found the electrocautery unsatisfactory.

Dr KELSON thought that the subject of tonsil enucleation required revision.

Dr MOORE (replying) said that he had treated fifty cases with caustic paste, and, in all, results were satisfactory.

Notes of Two Cases of Pharyngeal Diverticula were communicated by Dr W. H. KELSON (*Journal of Laryngology*, Nov. 1919, p. 444).

In one case the pouch was removed under local anæsthesia.

Sphenoidal Sinus Empyema and Cerebro-spinal Meningitis was the title of a paper by Drs D. EMBLETON and E. A. PETERS (*Journal of Laryngology*, Jan. 1920, p. 11).

Dr WATSON WILLIAMS urged the importance of routine examination of the sphenoidal and other sinuses, with culture investigations, in all cases of cerebro-spinal meningitis.

Sir St CLAIR THOMSON did not regard the exploration of the sphenoidal sinuses as an easy procedure.

Royal Society of Medicine

Mr WALTER HOWARTH read a paper on **Sellar Decompression for Pituitary Tumours** (*Journal of Laryngology*, Feb. 1920, p. 49). In reply to questions Mr Howarth stated that in no case had there been severe hæmorrhage. The operation was not for the removal of large growths but was intended to relieve pressure.

Dr W. S. SYME contributed a paper on **A Series of Cases of Maxillary Antral Disease**.

The following demonstrations were also given during the course of the Congress:—

Microscopic Specimens, by Dr WYATT WINGRAVE.

Casts and Models illustrating Rhinoplasty, by Mr H. D. GILLIES and Mr G. SECCOMBEE HETT.

Application of Radium in Malignant Disease of Œsophagus, by Dr WM. HILL.

Treatment of Ozæna by Ionic Medication, by Mr A. J. HUTCHISON.

ABSTRACTS

EAR.

A Physiological Study of the Eustachian Tube and its Associated Muscles. ARNOLD RICE RICH. (*Bulletin of Johns Hopkins Hospital*, June 1920.)

The physiological mechanism of the Eustachian tube is a matter of much controversy, but the work of the present writer will go far towards placing our knowledge of the subject on a sounder and more exact basis. By a series of careful experiments on dogs, he sought to ascertain, firstly, the physiological conditions under which the tube is open, and, secondly, the muscles which influence the patency of the tube. The tympanic membrane functionates perfectly only when the atmospheric pressure is the same on both sides of it. This equalisation of pressure is made possible by the inflow of air from the nasopharynx through the Eustachian tube into the tympanic cavity. While making sudden changes in altitude, aviators often suffer distressing difficulties referable to the ear.

Eustachius believed that the tube normally was open. Toynbee first insisted that the pharyngeal orifice normally is closed, and that it is opened during deglutition to permit an inflow of air. Swallowing with both mouth and nose closed causes a feeling of tension. If now the mouth and nose be opened a return to normal should occur immediately if the pharyngeal orifices of the tubes be always open. No such change occurs, however, until a second swallowing movement is performed with the nose open. Lucae concluded that during swallowing and phonation there occurs a closure of the mouth of the tube which is again opened when the soft palate descends. Lucae also held that the tubal orifice opens during expiration and closes during inspiration.

Experiments.—Dogs were used in all of the animal experiments described in Rich's paper. *Operation.*—Tracheotomy: both common carotid arteries ligated: mouth-gag to hold the jaws widely separated: incision through the soft palate to expose the nasopharynx. The two tubal lips are plainly seen to lie, normally, in contact, *i.e.*, the tubal orifice is normally closed when at rest. Rich found that the swallowing reflex is accompanied by a wide gaping of the tubal orifices. This is brought about by the tensor palati, which draws the membranous wall away from the cartilaginous wall, the latter undergoing no appreciable change of position. The opening of the tube is quite brief and occurs at the moment of greatest contraction of the upper pharyngeal muscles—when the hyoid bone is at the height of its

Ear

ascent. During forced respiration the pharyngeal orifices of the tubes remain closed, even though the palate is being elevated vigorously by the levatores palati. Elevation of the palate, alone, is certainly not accompanied by an opening of the Eustachian tube. Contraction of the tensor palati muscle is the *conditio sine qua non* of every physiological opening of the tube. Contraction of the tensor palati may occur synchronously with elevation of the palate at times other than during the swallowing, yawning, and sneezing reflexes.

It has long been believed that concussion of the tympanic membrane from loud reports is minimised by mouth-breathing, and the reason assigned has been the supposed accompanying opening of the tube. Rich's experiments, however, were all made upon animals breathing with wide-open mouths, and the tubal orifices were clearly seen to be closed. Nasopharyngoscopic observations upon human subjects also showed that there occurs no dilatation of the ostium during mouth-breathing. It was thought that perhaps the mere existence of a difference in pressure on the two sides of the tympanic membrane might be a sufficient stimulus to set in motion a reflex opening of the tube and a consequent restoration of pressure-balance. Green, in a report on the effects of descent in a diving-bell, described the actual rupture of the tympanic membrane owing to the inequality of pressure exerted upon it; this occurred especially in persons uninstructed in the method (swallowing) of restoring the pressure-balance. It was the apparent lack of such a reflex adjustment in the case of aviators which led to Rich's research. The pressure in both external auditory canals was raised greatly by means of rubber atomiser bulbs, which were sealed into the ears of anæsthetised dogs. No opening of the tubes occurred. In human subjects the tubal orifices were seen to open reflexly only during deglutition and sneezing. Further, the tubes are open during the yawning reflex for a longer period of time than during deglutition.

Muscles which influence the Tube.—The tensor and levator palati muscles have long been associated with the physiology of the tube. Valsalva regarded the former as a dilator of this structure. The problem is to prove that, during the act of swallowing, the tensor palati gains a fixed point below, so that the fibres arising from the membranous portion of the tube are able to dilate the tube. During deglutition the soft palate becomes this "fixed point." Other observers oppose this view. Mouret and Rouvière have stated on anatomical grounds that the levator opens the pharyngeal orifice, while the remainder of the tube is dilated by the tensor. Others considered the levator as a tubal constrictor. According to Packard, the palato-pharyngeus muscle has an auxiliary action in opening the tube. Gellé adds the superior constrictor of the pharynx to the list of muscles which have been regarded as dilators

Abstracts

of the tube. Rich attempted to lay bare all of these muscles in the living animal by careful dissection, leaving their nerve supplies intact. By electrical stimulation of the individual muscles he determined the action of each. The integrity of the nerve supply was tested after completing the dissection by watching for the contraction of the individual muscles during the swallowing reflex. Contraction of the internal pterygoid was seen to be entirely without effect upon the pharyngeal orifice of the tube. Stimulation of the palatopharyngeus, pterygopharyngeus, and superior constrictor causes no change in the condition of the tubal orifice. Further, stimulation of the levator palati does not affect the orifice in any way. When the tensor palati is stimulated, its contraction is accompanied by a wide gaping of the pharyngeal orifice of the tube and a tension of the fibrous expansion of its tendon in the soft palate. The dilatation is clearly seen to be caused by the muscle pulling against its attachment to the membranous wall of the tube, and so drawing this portion away from the cartilaginous wall. The palatal insertion of the tensor is unessential to the dilatation of the tube, for the fibrous expansion of the tendon may be cut through in its entire extent without affecting the tubal dilatation. The attachment of the tensor to the hamular process is the only fixed point necessary. Rich divided in turn the palato-pharyngeus, the levator palati, and finally the tensor palati. The tubal orifice was widely opened during each swallowing reflex until the tensor had been cut, whereupon the reflex was no longer accompanied by the slightest opening of the tube.

It has been noted by otologists that a catheter introduced into the Eustachian tube rotates somewhat during deglutition. A long straw was introduced into the tube through the pharyngeal orifice and kymographic tracings obtained from the free end. On stimulation of the tensor palati muscle there occurred a marked deflection of the straw.

Rich's experimental conclusions were supported by nasopharyngoscopic observation of a patient who suffered from a unilateral paralysis of the tensor palati muscle following disease of the fifth nerve. The orifice of the tube on the affected side appeared somewhat more patulous than that of the normal side; during deglutition, the unaffected tube gaped normally, while the orifice on the paralysed side remained quite stationary. J. S. FRASER.

A Case of Right Mastoid Suppuration causing left-sided Facial Paralysis.

E. WATSON-WILLIAMS (*Lancet*, 1920, Vol. i., p. 1364) reports this unusual case in a woman aged 21. The radical operation on the right revealed thrombosis of the lateral sinus and internal jugular. It was followed by improvement in the left facial paralysis and ptosis, both of which disappeared in three days. The patient became delirious on the third day and died suddenly. Death was due to pulmonary embolism. There was an extradural abscess over the petrous on the right side, drained by operation. An extensive fibrino-purulent mass reached from the curve of the sigmoid sinus across the mid-line and into the left posterior fossa, completely surrounding the 3rd, 4th, and 6th nerves on both sides, and the 5th, 7th, and 8th on the left only. The bone showed no evidence of infection after stripping the dura. The left facial paralysis and its curious diminution after operation on the right side were thus explained.

MACLEOD YEARSLEY.

Incomplete Mastoid Operation as a Cause of Delayed Healing.

FREDERICK THAYER HILL. (*The Laryngoscope*, 1920, Vol. xxx., p. 154.)

Hill considers five or six weeks as good time in which to get complete recovery after the simple mastoid operation. The presence of adenoids, diseased tonsils, deviated septum, and accessory sinus infection must be considered.

With regard to the types of mastoid process, Hill agrees with Politzer, who gives the following ratio: pneumatic, 37 per cent.; diploetic, 20 per cent.; diplo-pneumatic, 42 plus per cent; sclerotic (scattering). Out of a series of 168 "simple" mastoids in which the ratio given by Politzer was pretty consistently borne out, there were sixteen cases which came to secondary operation. Of these, two were of the pneumatic type, five diploetic, and nine diplo-pneumatic. Hill states that the average aural surgeon will not consider his operation complete until he has followed out every cell. In the diploetic and diplo-pneumatic types the operator, upon reaching what he feels is sound bone, is apt to consider discretion the better part of valour and stop before completely exenterating the mastoid. Hill finds that in about 12 per cent. of the cases re-operation is necessary. Unless the mastoid is completely cleaned out we may have a condition simulating a chronic osteo-myelitis. Too many mastoid operations may be likened to sweeping a room without touching the corners. The zygoma,

Abstracts

the cells or diploë just posterior to the external auditory meatus, the tip, and the angles between the sinus and the floor of the middle fossa and the sinus and the digastric groove, should be as thoroughly exenterated as possible. One case, at the second operation, showed an area of necrotic dura in the angle between the sinus and the middle fossa. Meningitis developed and death ensued. Post-mortem revealed a temporo-sphenoidal abscess. Three cases developed sinus thrombosis. A perisinus abscess was found in each case. In no case where the mastoid was completely exenterated was secondary operation required. It was not deemed necessary to uncover the sinus itself but simply to outline the dense bony plate covering it. The middle ear was dry in from two to five days as a rule. The method of after-treatment employed seemed of minor significance. Hill comes to the following conclusions: Early healing and uneventful convalescence depend upon thorough exenteration. Cases of delayed healing, requiring secondary operation, are met with more frequently in the diploetic and diplo-pneumatic types, where there is a persistence of the diploë or "dense mastoid mass." In such a mastoid the surgeon is apt to neglect certain areas, this oversight being less likely to occur in the cellular mastoid. The "favourite points" overlooked are: the angle between the sinus and the floor of the middle fossa, the space between the sinus and the prominence of the digastric groove, and, less frequently, the zygoma, posterior meatal wall and tip.

J. S. FRASER.

The Bárány Tests in Tumours of the Nervus Acousticus. HARRIS H. VAIL. (*The Laryngoscope*, 1920, xxx., p. 505.)

Spontaneous nystagmus was present in all ten cases, on looking upward in seven cases, when looking to one or other side in nine. Of five right-sided lesions, nystagmus to the left was greater in three cases. In the other two cases equal to right and left. Of the five left-sided lesions, in one case nystagmus to the right was greater than to the left; in one case the reverse; two cases showed only nystagmus to the left; downward nystagmus in one case.

Spontaneous Past Pointing.—Seven cases showed normal past pointing reactions. One case (left-sided) showed slight tendency to deviation inward of left arm. One case (left-sided) showed definite outward deviation of left arm. One case (right-sided) showed definite outward deviation of right arm.

Rotation.—After-nystagmus of proper type and direction was obtained in nine cases. In almost all of these the duration was less than normal, *i.e.*, about ten to twenty-four seconds. It was absent

Ear

entirely in one case. One case showed tendency to conjugate deviation to side opposite to lesion.

Past Pointing after Rotation.—Three cases showed no past pointing. One case showed, when rotated to side opposite to lesion, inward pointing on the side of the lesion. No past pointing on other side. One case showed normal past pointing with absence of after-nystagmus. Diminished but otherwise normal past pointing reactions were obtained in five cases.

Hearing.—Absolute deafness on side of lesion in three cases. Loud voice was only heard close to ear on side affected in five cases. Conversation heard close to ear on side affected in two cases. Hearing tests were all done while continuous irrigation of opposite ear was being carried on.

Caloric tests.—In all the cases there was a failure to obtain after-nystagmus with cold water from vertical canal stimulation on the side of the lesion. On tilting the head 60° backward there was a failure to produce horizontal after-nystagmus. In four cases no after-nystagmus was obtained after stimulation of ear opposite to the side of the lesion with the head in the 30° forward position. In two of these cases tested with the head 60° back, a horizontal after-nystagmus was obtained. In six cases the nystagmus following irrigation of ear opposite to side of lesion appeared within one and one-half minutes. In four of these, past pointing after syringing was normal in direction but diminished in extent. In the other two cases no past pointing was present.

Two cases, with failure to produce nystagmus from caloric test of the unaffected side, were again tested after operation, and showed absence of nystagmus and past pointing reactions on the side of the lesion, with practically normal response from stimulation of the opposite side. This finding agrees with that of Eagleton (*Laryngol., Otol., and Rhinol., Section of the American Med. Assoc.*, 1917, p. 190), who recognised that increased intracranial pressure affected the side opposite to the lesion. The author thinks that the increased pressure present in all these cases is responsible to a great extent for the irregular reactions found by the rotation tests. The reactions described in the above cases are quite similar to those reported by Jones (*Equilibrium and Vertigo*, Philadelphia, 1918). Jones also states that frequently the vertical semicircular canals of side opposite to the lesion fail to respond to stimulation. This is due to pressure transmitted across the midline. Gray (*Amer. Journ. Med. Sciences*, 151 (1916), pp. 693-704) in nine cases of cerebello-pontine tumours obtained reactions similar to the above in four cases. He found absent responses in one case and doubtful responses in one other case.

J. S. FRASER.

Abstracts

Labyrinthine Complications in Middle Ear Suppuration. HERBERT J. MARKS. (*Medical Journal of Australia*, 8th May 1920, Vol. i., 7th Year, No. 19, p. 429.)

Marks, in a paper read at the Congress on Diseases of the Eye, Ear, Nose, and Throat at Melbourne on 1st November 1918, says that this subject has been so fully discussed in recent works on Otology that he will deal concisely with it, his object being to invite a discussion on some points regarding which there is still considerable difference of opinion. He refers to the indications for operation, and the operation suitable for each individual case. Notwithstanding his modest objective, his paper is so full that it deserves to be read in the original. To Bárány he gives the credit of recording, in 1907, the value of the symptom of spontaneous nystagmus as a diagnostic sign in labyrinthine suppuration. Before this symptom was understood many labyrinths were unnecessarily opened up, with a high degree of mortality, when more conservative methods should have been adopted, while many cases of meningitis of labyrinthine origin were operated on too late.

We now have at our disposal recognised methods of eliciting rhythmic nystagmus of labyrinthine origin. A normal response indicates a functional labyrinth, a failure to respond, partial or complete disorganisation of the labyrinth.

The life of the patient may depend on an accurate investigation of the functions of the labyrinth. It is our duty to be on the alert for symptoms of labyrinthine involvement in acute cases of middle ear suppuration of a high degree of virulence and in chronic cases accompanied by cholesteatoma, polypus formation, and tuberculosis. A suppurating labyrinth may impair or destroy the function of the vestibular apparatus and may infect the cranial fossa. If we have formed a definite diagnosis, timely surgical interference may cut short the morbid condition. In some degree the function of the labyrinth may be preserved and intracranial invasion prevented. Labyrinthitis is rare in acute otitis media. In cases of acute otitis media the invasion of the labyrinth is generally through the oval window, in chronic cases through the external semi-circular canal.

Several classifications of labyrinthitis are given *in extenso*, but the important point to determine in an individual case is the distinction between a diffuse and a circumscribed process, and further between a purulent and serous labyrinthitis.

A radical mastoid operation is imperative in every case of labyrinthine suppuration. Functional testing before the operation and the condition of the inner tympanic wall found at the operation will determine whether we must proceed to drain the labyrinth. Clinical notes of six cases of unusual interest are given. A. J. BRADY.

Ear

Vestibular Vertigo of Non-suppurative Origin. KERRISON.

(*The Laryngoscope*, 1920, Vol. xxx., p. 626.)

Kerrison states that vestibular vertigo of non-suppurative origin must include any disturbance of equilibrium, the pathological sequence of which includes a disturbed vestibular balance. The search for an extra-aural focus of disease may lead to finding a gastro-intestinal infection, a diseased tonsil, an infected dental root, an abscess in the most distant part of the body, cerebro-spinal syphilis, nephritis, or any dyscrasia causing chemical changes in the blood, such as ptomaine poisoning. Any of these lesions, when they give rise to a disturbance of balance between the two static labyrinths, induce vertigo of vestibular type.

Conclusions.—Constant or semi-constant vertigo as a result of a functionally dead labyrinth is practically a clinical impossibility. The coincidence of a functionally inactive labyrinth and persistent vertigo suggest, therefore, either that (*a*) the labyrinthine lesion is potentially active and progressive, or (*b*) the vertigo is intercurrent and to be otherwise accounted for. In vertigo of purely vestibular type, relief occurs in one of two ways: (*a*) by restoration of normal nerve tone and function, or (*b*) by absolute nerve paralysis or destruction. The vestibular nerves are rather susceptible to toxic agents reaching the ears by the blood or lymph channels. Vertigo depending upon a vestibular neuritis of recent development—the cochlear mechanism escaping injury—recovers quickly when the cause is removed. In vertigo depending upon a chronic non-suppurative lesion involving the static and auditory mechanism alike, the prognosis is exceedingly uncertain, *i.e.*, the probability of recurrent attacks from slight causes is very considerable. Cases of vertigo beginning with a sudden onset give, as a rule, a distinctly more favourable prognosis than do the more indefinite types of gradual development.

The clinical details of the nine cases recorded are well worth reading in the original.

J. S. FRASER.

The Labyrinthine Reactions of Experienced Aviators. DAVID RANKEN.

(*Brit. Med. Journ.*, 26th June 1920.)

This investigation was undertaken in order to ascertain the difference, if any, between the labyrinthine reactions of experienced pilots and those of the average individual of the same age who had done no flying.

The rotation tests were employed, as carried out by Colonel Isaac Jones, of the American Air Force, and described in his book on "Equilibrium and Vertigo." The present writer found that in the aviator the duration of nystagmus after turning was slightly less than

Abstracts

the normal average, and that past-pointing errors were likewise less. In pilots who had done 100 to 1000 hours in the air nystagmus lasted 23 seconds, whilst in those who had over 1000 hours to their credit the average nystagmus time was 21 seconds. The normal average is generally said to be 26 seconds. Vertigo, after turning, lasted only 12 seconds in the aviator—that is, half the time which is regarded as the normal average. The author found, however, in examining cadets for the Air Force, that the vertigo period in the normal, non-flying individual was only 15 seconds, and it would thus appear that the vertigo reaction, like those of past-pointing and nystagmus, is only slightly diminished in the aviator. The results appeared also to indicate that stimulation of the right labyrinth produces less past-pointing and vertigo, but a longer nystagmus period, than stimulation of the left labyrinth.

From his investigations the writer concludes that :

(1) Experienced pilots have, if anything, a slight tendency towards diminished labyrinthine reactions.

(2) Disturbance, past or present, of some other system of the body may affect labyrinthine reactions.

(3) Where deafness is present no medical examination of a candidate or pilot is complete without a careful investigation of the semicircular canals on both sides.

(4) In the absence of past or present aural symptoms, the routine employment of the Bárány tests is superfluous provided a thorough general medical examination is made. DOUGLAS GUTHRIE.

The Falling Reaction of Acrobatic Aviators. ROBERT J. HUNTER.

(*The Laryngoscope*, 1920, Vol. xxx., p. 312.)

To see if aviators show any change in the falling reaction, after experience in the air, Hunter stimulated the vertical canals only, as they are the ones involved in loops and tail spins and would show the most marked change, if any. For the pointing error after stimulation of the vertical canals, the back muscles are used, and the error is falling to one side. (1) Twenty-seven men who had had experience of acrobatic flying, varying from 35 to over 600 hours, were turned. Their average degree of falling was 2.9 degrees. (2) In another group of five aviators, with experience in acrobatics varying from ten to twenty hours, the average degree of falling was 6.7 degrees. (3) Eleven ground men were then examined ; the average degree of falling was 20.6 degrees. Thus the difference between the experts and the untrained men was very marked, and showed that men used to air work give less response to the falling test than ordinary men. Lewis states that whirling dancers all maintain that, in spite of the fact that they have engaged in exhibitions for many

Ear

years, they always have vertigo. These performers, when examined in the turning chair, had nystagmus of normal duration. The duration of after turning nystagmus in Army Aviators, as reported by Fisher and Babcock, and Levy, is normal. Dunlap, however, finds that nystagmus is less after repeated turning. As past pointing is entirely a voluntary act, it appears that through training, these men have learned to ignore the excessive vestibular stimuli, and sit up straight in spite of the fact that they feel that they are turning.

J. S. FRASER.

Mastoid Disease with Cholesteatoma Complicated by a Cerebral Abscess.

R. GRAHAM BROWN (Brisbane). (*Med. Journ. Austr.*, 6th March 1920.)

The patient was a woman, aged 27. Since infancy she had suffered from a discharge from the left ear. She had suffered no pain in the ear till three months before she was seen by Brown. For three months the pain had been gradually getting worse, at times nearly driving her crazy.

There was no mastoid tenderness or redness. There was no bulging or redness of drum membrane. There was a "pin-head" perforation in Shrapnell's membrane. Mastoid operation: mastoid process a mere shell of bone filled with cholesteatoma. Lateral sinus exposed, fluid blood withdrawn. Roof of antrum necrosed over area of diameters 0.8 cm. by 0.6 cm.

Next day temperature 40° C., psychical aphasia; later, partial word-deafness. Cerebral abscess in second temporal convolution left side diagnosed. Blood-stained fluid, but no pus found at depth of 2.5 cm. Patient recovered.

A. J. BRADY.

The Treatment of Chronic Otorrhoea by Zinc Ionisation. A. R. FRIEL. (*Lancet*, 1920, Vol. ii., p. 345.)

The author considers zinc ionisation useful. Where polypi have been dealt with subsequent ionisation will cure the discharge. He has treated ninety-nine cases, but cannot say in what proportion ionisation will effect a cure, although he "knows it is large."

MACLEOD YEARSLEY.

Symptomless Influenzal (Streptococcal) Mastoiditis. F. F. MUECKE and C. GRANTHAM-HILL. (*Lancet*, 1920, Vol. ii., p. 241.)

F. F. Muecke and C. Grantham-Hill draw attention to a class of influenzal mastoiditis displaying the following features: very acute earache occurring on the second or third day of a mild influenzal attack. Upper part of the drum red and bulging from the beginning.

Abstracts

Early perforation followed by unusual hæmorrhage and complete relief of all pain. Redness and swelling of the posterior meatal wall shortly after appearance of discharge. Discharge first slight, profuse the second or third day. No other symptoms. On opening the mastoid (invariably of the pneumatic type) early necrosis found, with large pus-filled cavities. Subsequent progress rapid and uneventful.

In all cases streptococci of the hæmolytic influenzal type found in large numbers.

Early recognition of these cases is highly important.

MACLEOD YEARSLEY.

Radium Treatment in some Cases of Eustachian Obstruction.
G. HOLMGREN (Stockholm). (*Acta Oto-Laryngologica*, I., Fasc. I.)

The writer reports three cases of secretory middle-ear catarrh with loss of hearing, Eustachian obstruction, and fluid exudation in the tympanic cavity, all of which had failed to clear up as a result of repeated catheter inflation. The ear condition in the first was due to the presence of a sarcoma immediately behind the Eustachian opening. In the second case there was present a diffuse thickening of the lining membrane of the nasopharynx, which on microscopic examination was reported also to be sarcomatous, but of the correctness of this diagnosis the author is doubtful. The third case showed no obvious nasopharyngeal lesion, but it was assumed that the Eustachian blocking was due to swelling of the tubal tonsil. In each of the cases the ear trouble cleared up completely and permanently after a single treatment by the application of radium to the nasopharynx.

Lymphoid tissue in all parts of the body is especially sensitive to radium, but the writer believes that these three cases are the first in which this fact has been made use of in the treatment of ear conditions. He considers that radium will in the future prove to be of great value in dealing with cases of this nature.

THOMAS GUTHRIE.

MISCELLANEOUS.

Deep Cervical Abscess and Thrombosis of the Internal Jugular Vein.
HARRIS P. MOSHER. (*The Laryngoscope*, 1920, xxx., p. 365.)

Mosher records the case of a male, aged 26, suffering from general septicæmia, who three weeks before had had a retropharyngeal abscess opened. Examination showed a small retropharyngeal swelling on the right side. There was some swelling of the neck and tenderness about the middle of the sterno-mastoid. The chart was violently septic, 94 to 107. Blood cultures had been twice negative. Greene incised the retropharyngeal swelling and evacuated a considerable

Miscellaneous

quantity of pus. Next day obstinate hiccough was present and the swelling of the neck increased. Mosher suspected the possibility of thrombosis of the internal jugular vein. At the second operation the carotid artery presented within the sheath but not the vein. On working outward the blunt dissector fell into a large foul abscess cavity. The vein could not be recognised, but over the vagus there was a strip of tissue like a thrombosed vein. At this point the patient stopped breathing and died. The pathological report stated that the thickened tissue was probably disorganised and thrombosed vein. A similar case was reported by Goldman in the *Annals of Otology*, June 1917. In Goldman's case the symptoms pointing to thrombosis began five days after an attack of acute tonsillitis. Blood cultures were sterile. The thrombosis of the vein was not extensive, occurring only at the junction of the facial vein. The patient recovered. Mosher goes very fully into the anatomy of the pharyngomaxillary fossa. An otitic perisinus abscess is watched knife in hand. This should be the rule in deep cervical abscess. At the first sign of a septic temperature, or chill, the vein should be excised. The case should not be labelled septicæmia, and our surgery confined to the taking of blood cultures. Infection can reach the vein from the tonsil just as readily as from the middle ear.

J. S. FRASER.

Röntgenological Determination of Pulmonary Tuberculosis. F. E. DIEMER and I. H. CRAMER. (*Amer. Journ. Med. Sci.*, December 1919.)

This paper is founded on the examination, clinical and radioscopic, of some 600 cases of pulmonary tuberculosis at a military camp. Especial attention was devoted to a correlation of the physical and X-ray findings. The authors reach the following main conclusions:—

(1) The definite determination of pulmonary tuberculosis by means of the X-rays alone is possible in practically every stage of the disease. The stage and activity of the process are less certainly established by X-rays alone than by physical examination alone, but a combination of both is decidedly more reliable than either alone.

(2) The stage of excavation is readily determined.

(3) Certain X-ray findings are definitely pathognomonic of pulmonary tuberculosis.

(4) The exact area of involvement is more readily made out by X-ray examination than by other clinical methods, but the latter are of more assistance in regard to prognosis.

(5) When cavitation is present, the extent and activity of the process can hardly be estimated without the Röntgen rays.

(6) X-ray examination is indispensable in treatment by artificial

Abstracts

pneumothorax. X-ray study indicates when lung collapse goes on to lung compression, and the amount of pressure necessary to separate the adhesions.

THOMAS GUTHRIE.

Complete Bilateral Spastic Paralysis of Face, Jaw, Tongue, and Larynx, following an Acute Illness. JAMES COLLIER. (*Proc. Roy. Soc. Med.*, Section of Neurology, January 1920, p. 47.)

A girl, aged 10, was in every way healthy and normal until 6 years of age, when she contracted scarlet fever. Three weeks later, when convalescent from the scarlet fever, she acquired meningitis. She developed a squint, became unconscious, and lay semi-conscious for three weeks. Her limbs were not paralysed during this time. She has never been able to speak nor to move her face voluntarily, nor to eat nor swallow naturally since regaining consciousness. She is a very intelligent child, and writes well. With the exception of slight perversity of movement in the use of the fingers, the condition of the limbs and trunk are in every way normal. Ocular movements are normal. With the exception of retraction of the angles of the mouth there is no volitional movement of the face, jaw, tongue, or larynx. The face is in spasm. The teeth are lightly clenched, and the masseters are in spasm. There is much dribbling of saliva. She feeds by pressing soft food into her cheek with her finger, closing the oral aperture with the hand, and squeezing it through the teeth by the pressure of her fingers upon the cheek. Reflex swallowing is normal. The emotional movements of the face in smiling and crying are normal, and during these movements only is the mouth opened. She makes no attempt at articulation. She has recently begun to use a slight laryngeal grunt as a query and as an affirmative.

ARCHER RYLAND.

Hydrochloric Acid Poisoning with Sloughing of Part of the Œsophagus. J. BURTON CLELAND. (*Med. Journ. Austr.*, 21st February 1920.)

This is the history of a case where gross distinctive lesions followed the above cause, yet for a time the patient had relatively little local inconvenience. He died five months later after gastrostomy, performed because the œsophagus could not be dilated so that food could be swallowed.

A. J. BRADY.

The Cleft Palate Speech. C. MACMAHON. (*Brit. Dental Journ.*, 1st September 1920.)

This short paper deals with the education of patients after operation, and gives precise instruction for the production of the more difficult letters such as K, G, D, T, and S. A number of useful test sentences are included.

DOUGLAS GUTHRIE.

Miscellaneous

The Incidence of Nose, Throat, and Ear Disease among Aviation Candidates. D. RANKEN. (*Lancet*, 1920, I., 800.)

A most instructive and thought-compelling paper. Three tables are given, analysing nose, throat, and ear defects of 5000 aviation candidates, showing the incidence of chronic suppurative otitis media and hearing defects in 47,069 candidates, and the incidence of the same conditions in 1500 rejected candidates. A calculation based upon the figures given shows that aural disease appears seriously to affect 2.8 per cent. of the young men of the middle classes. The obvious conclusion is "that much remains to be done before the amount of nose, throat, and ear disease affecting the youth of this country can be said to have been brought down to a negligible factor or an irreducible minimum."

MACLEOD YEARSLEY.

Report of the Committee on the Advantages and Disadvantages of the Various Local Anæsthetics in Nose and Throat Work. Dr EMIL MAYER, Chairman. (*The Laryngoscope*, 1920, xxx., p. 443.)

The entire report refers to adults only. The ideal anæsthetic having the effects of cocain and absolutely non-toxic has not been found. Novocaine ($\frac{1}{2}$ to 1 per cent.) appears to be the most popular local anæsthetic for injection.

Summary (abridged).—None of the synthetic products equals cocain in its local effect when applied to the mucous membrane. Synthetic products may be freely injected if this is done slowly. Fatalities either occur immediately or not at all. The greatest danger lies in too rapid injection or in entering a vein. Idiosyncrasy does exist. Local anæsthesia is undoubtedly the choice of methods by all American rhinologists in nose operations. It is also the choice of a very large proportion in throat operations. A small number believe that tonsil operations particularly are best performed under general anæsthesia. The dangers of hemorrhage during tonsil operations under local anæsthesia are no greater than under general. There is no greater danger from post-operative hemorrhage under local than under general anæsthesia.

Suggestions.—All operations should be performed with the patient recumbent, beginning with the first application of the local anæsthetic, except in sinus operations, where the head and shoulders may be elevated. Each operation to be preceded by a hypodermic injection of morphia and atropin and the patient kept in hospital. In nose operations, adrenalin should be applied first, followed by cocain. The injection of the synthetic drug should be carried out slowly. Where there may be a suspicion of possible danger (cardiac disease, Basedow, or other disturbances of internal secretion), one-fourth of

Reviews of Books

the amount of anæsthetic to be used should be applied, and the patient watched for possible toxic effects.

Recommendations.—A permanent committee on "Toxicity following Local Anæsthesia" should be formed. Reports of fatalities should be promptly reported to the Secretary for further study by the Committee. The Committee further recommends that a change be made from the old method of introducing new local anæsthetics—clinical data furnished by medical men chosen by the manufacturer. Such investigation should be made by clinicians chosen by the Committee. A fund should be placed in the hands of the Therapeutic Research Committee to reimburse the physicians making these studies. They recommend the use of the soluble tablets of cocaine for making the fresh solution as required.

J. S. FRASER.

REVIEWS OF BOOKS

Diseases of the Throat, Nose, and Ear. By DAN M'KENZIE, M.D., F.R.C.S.E. (Wm. Heinemann, Ltd., London, 1920.)

It is a matter for congratulation that a man of Dr Dan M'Kenzie's standing has been able to gather together the fruits of his long experience in the specialty and to place them so successfully at the disposal of his fellows in the profession. As is stated in the preface, the book has been written from the practical point of view, and considerable attention has been devoted to operative surgery. It is not stated to which class of reader the work is intended specially to appeal. While points of academic interest and details of technique are not unduly dwelt upon, there is much that renders the book worthy of perusal by the specialist. The ordinary practitioner will find that here is a book which gives him a broad and properly focussed view of the subject without inflicting on him minutiae in which he has no interest. The illustrations are good and of real instructional value. They are not, as is so often the case in works of this nature, simply a series of copies from an instrument maker's catalogue. One wonders whether the value of the book would not have been enhanced by an even more free use of diagrams.

The dictum that paralysis appearing after a sore throat of any kind means that the disease has been diphtheria may meet with criticism from some who have in mind cases of influenza which have been followed by paralysis. Dr M'Kenzie urges the removal of the tonsils in all cases of tuberculosis of the cervical glands. Dealing with syphilitic disease of the pharynx, he gives a short but useful résumé of the modern treatment of syphilis in general.

Reviews of Books

A short account is given of direct and suspension laryngoscopy, bronchoscopy, and œsophagoscopy. The author adopts a conservative attitude towards laryngeal tuberculosis. His experience of galvanopuncture in the treatment of that disease is not favourable.

Dr M'Kenzie apparently regards the thyroid gland, to which he devotes seven pages, as lying within the province of the throat specialist.

Reference is made to the usefulness of the endoscope in the nose and nasopharynx. This instrument certainly seems to be deserving of more attention than is at present accorded to it. For local anæsthesia in nasal operations, the author recommends Freer's cocaine-adrenalin paste as supplying the maximum local with the minimum constitutional effect. The method of using it is detailed. The operation of submucous resection of the nasal septum is described at some length. Before packing the nose after the operation, Dr M'Kenzie places a metal tube in each side of the nose and inserts his packing round that. He considers that snuffing fluid into the nose is dangerous, while douching from a raised reservoir is harmless but ineffective. A syringe on the Higginson principle should be used. In cauterising the inferior turbinal, he recommends the making of a small puncture in the anterior end of the turbinal with a fine sharp knife and the performing of a submucous cauterisation.

In Dr M'Kenzie's experience the Caldwell-Luc operation on the maxillary antrum has not proved any more efficacious than the simpler nasal antrostomy. This latter operation he recommends. For the frontal sinus he advocates the Ogston-Luc operation. As a general principle in the treatment of sinus suppuration he inclines to the view that in skilled hands intranasal operation is the safest. There seems to be some confusion among rhinologists as to the precise anatomical meaning of the term *infundibulum*. Dr M'Kenzie uses it as synonymous with fronto-nasal duct.

B.I.P.P. is commended as a useful application for the cavity after mastoid operations. The author considers that Heath's modified mastoid operation is disappointing. The Schwartze operation he calls the "cortical operation." He objects to the term "radical mastoid operation" on the ground that it is not radical and only partially mastoid. He does not suggest a better name. He emphasises the fact that in lateral sinus phlebitis in most cases, even at an early stage, there is œdema of the scalp towards the occipital region posterior to the mastoid process. In septic meningitis he advocates drainage of the meninges in the neighbourhood of the primary infection, as well as spinal tapping. He states that this procedure has reduced the mortality by about 30 per cent. The methods are described in detail.

Reviews of Books

In noise deafness, the author's experience has been that the vestibular reactions have been impaired, the explanation probably being that the vestibular end organ may be stimulated by certain sounds as well as by change of position. Referring to shell-shock deafness and the question of discriminating between organic and functional cases, he expresses the opinion that although a normal vestibular reaction does not infallibly certify the deafness of every case in which it is found to be functional in nature, it may be regarded as strongly supporting that diagnosis.

A chapter is devoted to affections of the mouth.

In reading the book one is conscious throughout of the impression that what one is reading is the personal experience of a surgeon who has long and successfully practised and taught the specialty, and one gets from it a practical and comprehensive survey of the whole subject without being confused by too much elaboration of detail.

JOHN M. DARLING.

The Croonian Lectures on the Psychology of the Special Senses and their Disorders. By ARTHUR E. HURST. Oxford Medical Publications. 1920.

These lectures, which appeared in *The Lancet* during last July and August are now republished in a slightly abridged form. Based on the observation of a large number of cases, some of them of the highest interest for aurists and ophthalmologists they make a wide appeal to the Faculties of Divinity, Law, and Physic and to all who are in any way engaged in the study of mental processes. It is a pleasure to see the names of our fellow specialists Dr Peters and Mr Mollison associated with these investigations. Dr Hurst has made a very valuable contribution towards understanding that elusive factor, the nature of hysteria. His chapters are well and clearly written and, especially those on cutaneous anæsthesia and blindness, copiously illustrated. There is also a liberal bibliography from which it would appear that the author is more influenced by the teaching of Charcot's pupil Babinski than by the exponents of more modern investigation. One is surprised to find no reference to the work of Freud and Breuer, especially the former who, in 1895, started a new epoch in our view of hysteria. It may have been unnecessary to recall the name of Freud at the Royal College of Physicians, but this does not explain the absence of all reference to Freud's theory of "repressed emotions" or to the non-employment of psychoanalysis in the treatment. The comparative youth of the military patients would seem to mark them as peculiarly susceptible of permanent cure by this method. Perhaps it is to be sought under

General Notes

the often recurring expression "re-education." Freud divided the modern treatment of hysterical manifestations into that by suggestion, with or without hypnosis, and that by psycho-analysis. Quoting from Leonardo da Vinci, Freud compared suggestion with painting which, by a *via di porre*, puts something on, while he likened psycho-analysis to sculpture which, by a *via di levare*, gradually uncovers the statue within the stone. Freud regarded suggestion as easier of employment especially in slight cases, but much less likely to produce permanent results than psycho-analysis. Dr Hurst appears to have relied chiefly on suggestion, sometimes assisted by hypnosis, and it is interesting to note that he has recorded a permanency of cure of some years in certain instances.

JAMES DONELAN.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W.

Section of Laryngology (President, Dr W. Jobson Horne).—The next Meeting of the Section will be held on 1st April at 4 P.M. Members intending to show cases or specimens should send in their notes a fortnight before that date to the Hon. Secretaries, C. W. M. Hope, 22 Queen Anne Street, W. 1, or W. G. Howarth, 75 Harley Street, London, W. 1.

The Summer Congress of the Section of Laryngology will be held on 2nd, 3rd, and 4th June at 1 Wimpole Street. *2nd June*.—Papers will be read and discussed from 2.30 to 4 P.M. and from 4.30 to 6 P.M. *3rd June*.—Papers will be read from 10.30 A.M. to 1 P.M. Demonstrations will be conducted between 2.30 and 4 P.M.

The Ordinary Meeting of the Section will follow at 4 P.M. The Annual Dinner of the Section will take place at the Café Royal on the evening of the 3rd June (hour 7.30 for 8 o'clock).

4th June.—Papers will be read from 10.30 to 12 noon.

The titles of papers must be sent to the Hon. Secretaries not later than 2nd April, and a synopsis of the same for publication on the Agenda must be in the hands of the Secretaries by 3rd May.

There will be a Museum in connection with the Congress.

Section of Otology (President, Sir Charles Ballance).—The next Meeting of the Section will be held on 18th March at 5 P.M. Notices of papers and specimens and patients should be sent to the Secretaries,

General Notes

Lionel Colledge, 22 Queen Anne Street, W. 1., or Norman Patterson, 24 Park Crescent, London, W. 1, at least twelve days before the Meeting.

The Annual Meeting of the American Medical Association will be held in Boston, Mass., from 6th to 10th June. Dr William B. Chamberlin, 1020 Huron Road, Cleveland, Ohio, the Secretary of the Section on Laryngology and Otology will be pleased to give any information to Laryngologists and Otologists in this country who may be arranging to visit the United States early in June.

The British Medical Association will hold its Annual Meeting at Newcastle-on-Tyne on 19th, 20th, and 21st July.

There will be an International Conference on Tuberculosis in London on 26th, 27th, and 28th July, under the Chairmanship of Sir Robert Philip, Professor of Tuberculosis in the University of Edinburgh.

A combined Meeting of members of the American Otological Society and members of the Section of Otology of the Royal Society of Medicine will take place in London on 14th, 15th, and 16th July. Further details will be published later.

The Annual Congress of the French Society of Otology and Laryngology will be held in Paris from the 9th to 12th May 1921, under the Presidency of Professor Mouret of Montpellier.



SIR FELIX SEMON, K.C.V.O., F.R.C.P.
Born, 8th December 1849; Died, 1st March 1921

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

SIR FELIX SEMON

WITH the death of Semon, the *doyen* of British Laryngology has passed away. Through his energy and the strength of his personality, Semon did more than anyone in his time and generation to promote the advancement and to uphold the prestige of Laryngology as a specialty. When in 1877 he commenced practice in London, Laryngology was more or less in its infancy—to-day he has left it in a well-established and important position. By his writings, his activities, and the honesty of his character, he succeeded in placing the specialty upon an honoured and secure basis. His compeers and his successors alike will acknowledge the fruits of his endeavours and recognise the debt which they owe to his efforts.

Due to his initiative and his insistence, Laryngology was recognised for the first time—only as a sub-section, it is true—at the International Medical Congress held in London in 1881. In 1884, he started the *Centralblatt für Laryngologie*, and mainly as the result of his powers of organisation it became one of the leading Journals of its kind. In 1893, he founded the Laryngological Society of London, now merged in “The Section of Laryngology of the Royal Society of Medicine.”

The numerous and valuable contributions with which he has enriched the literature of the specialty are evidence of his

Sir Felix Semon

scientific acumen, of his powers of observation, and of his faculty of close reasoning.

Many will recall his acts of kindness, and remember with gratitude the encouragement which he gave them. To the younger men in the profession he was always accessible, and his advice and assistance were willingly given. His opinion upon cases shown at the meetings of the Section was constantly sought, and he was as ready to listen to and help the youngest member in the room as he was to discuss a difficult question with his senior colleagues.

Semon had many honours and distinctions bestowed upon him during his active career. But in his years of well-earned leisure, when reflecting upon the past, he probably valued most the affection and esteem which he had inspired in his numerous friends, while the knowledge that his life's work had been largely responsible for the position to which Laryngology had attained must have given him infinite satisfaction.

EDITORIAL

THE EDUCATION AND QUALIFICATION OF THE SPECIALIST.

THE recent decision of the Councils of the Sections of Laryngology and Otology of the Royal Society of Medicine to memorialise the two Royal Colleges in London, with a view to the granting of a Diploma in Laryngology and Otology by the Conjoint Board, is a definite step towards the consummation of what many have considered to be a long-felt want.

The specialist in Oto-Laryngology is, to a great extent, self-created; his training is largely a matter of opportunity, and, in the majority of instances, he commences the practice of the special branch without undergoing any prescribed course of training, or an examination test as to his fitness. The conferring of a Diploma upon duly qualified practitioners of medicine would provide them with a hall-mark; it would furnish evidence that the holder of such had not only received a definite course of instruction, but that he had attained to a standard of knowledge which qualified him to start the practice of his profession. Many junior specialists who have not yet attained a hospital position, feel the need of a special Diploma, and are justified in asking for an authorised curriculum and for the means of obtaining it.

In this country the Universities and the Licensing Bodies have gradually come to recognise the necessity of conferring Degrees and Diplomas in special branches of Medicine and Surgery. The Department of Public Health was one of the first to receive this recognition, consequent upon the passing into law of the Public Health Act of 1872, which required that all urban and rural authorities should appoint Medical Officers of Health in their respective areas. Prior to that date, the only certificate of special fitness for these posts was the Diploma in State Medicine, granted by Trinity College, Dublin. The University of Edinburgh took the initiative, laid down a curriculum and established a Degree in Public Health, which was conferred for the first time in 1875. During the forty-five years which have since elapsed, Degrees and Diplomas in Public Health have been established in many teaching centres,

Editorial

while other special branches of medicine and surgery have, in due course, received recognition from a number of the Licensing Authorities. Diplomas in Tropical Medicine and Hygiene, in Psychological Medicine, in Psychiatry, in Ophthalmic Medicine and Surgery, in Ophthalmology, and in Medical Radiology and Electrology, have been duly recognised, but there are other well-established departments of medicine and surgery which have not yet received the distinction which their increasing importance might justly lead them to expect.

It would not be right to assume from the foregoing statement that Laryngology and Otology have been altogether neglected by the Licensing Authorities, and that no opportunity has been offered to practitioners seeking a higher qualification and intending to practise in these branches, of having their knowledge tested by examination. Since the year 1884 the Royal College of Surgeons of Edinburgh has included Aural, Nasal and Laryngeal Surgery amongst the several optional subjects, one of which is required from candidates sitting for the Fellowship examination. For many years a number of practitioners purposing to specialise in Laryngology and Otology have taken advantage of this privilege and have passed both the examination in general surgery and in the special branch, and have received the Fellowship of the College.

In the Scottish Universities, too, provision was made by the Commissioners appointed under the Universities (Scotland) Act, 1889, to give candidates seeking the higher Degrees of Doctor of Medicine and Master of Surgery opportunity of being examined—in addition to the ordinary subjects required for the Degree—in a special department of Medicine and Surgery, approved by the Senatus, provided that on entering their names they should declare a wish to this effect. It will be observed, however, that in neither of the instances just quoted is any prescribed course of training asked for, and neither the Fellowship of the College nor the higher University Degree carries with it a special recognition of the subject which the candidate had selected. In each case, too, general surgery or medicine is the real academic test, the special subject chosen being only of subsidiary importance.

In the University of Birmingham, Gynæcology and Ophthalmology are specially mentioned, amongst other subjects, as suitable for the higher Degree of Ch.M., which the candidate

The Qualification of the Specialist

may present as the text of his Thesis, but he must pass at the same time a general examination in the principles and practice of surgery. At the University of London, the specialisation of the higher Degree is recognised. The M.D. may be taken in one of a number of special branches, and amongst the subjects which may be chosen for the M.S., Laryngology, Otology, and Rhinology now occupy a place.

In the Act of 1889, the Scottish Universities were also granted the power of conferring Diplomas upon their graduates in special branches of medical and surgical practice, and effect has been given recently to this in the special departments of Psychiatry and Public Health. At the present moment no Diploma has been established in such subjects as Laryngology, Otology, or Ophthalmology.

Perusal of the regulations drawn up by the majority of the Universities in Great Britain in connection with the more recently established Degree of Doctor of Philosophy (Ph.D.) in all the Faculties, makes it clear that a new portal has been opened for the further qualification of those registered practitioners who may be desirous of prosecuting special study and research. The successful termination of such study will be rewarded by the conferring of the Degree of Doctor of Philosophy, the graduate acquiring the title of Ph.D. in some branch of Law, Divinity, Arts, Science, and the Practice of Medicine. In the case of the last named, there is nothing in the regulations which would preclude the student from becoming Ph.D. in Laryngology and Otology. Research students must be graduates of approved Universities, or, in exceptional cases, other qualifications may be recognised by the Senatus. The special line of study desired by the applicant must be indicated at the outset, he must show evidence that his previous training has been suitable, that he is qualified to carry on special study or research, and that he is prepared to do so during a period of not less than two academical years. His work must be embodied in a Thesis or Dissertation, and the examiners, in addition, shall conduct such written or oral examinations as the Faculty or Committee may from time to time prescribe.

It is obvious from what has been said that Universities and Licensing Bodies not only have the power of recognising special departments of science and practice, but that they have bestowed qualifications in certain branches. The claims of Laryngology and Otology for similar treatment on a more extended scale

Editorial

cannot be denied, and it is right that they should be strongly advocated by those who are best qualified to advance them.

With the establishment of a recognised Diploma in Laryngology and Otology, a course of study would require to be defined, and provision would have to be made for offering prospective candidates suitable facilities for obtaining the necessary instruction and clinical training. The period of study before the examination could be taken, the subjects which should be embraced in the course, and the standard of knowledge which would be expected from candidates, would require to be carefully considered and regulations laid down by the Boards of Examiners.

In this connection it is not without interest to draw attention to the regulations which have been drawn up by the Royal College of Surgeons of England for the Diploma in Ophthalmic Medicine and Surgery, which is granted by the Conjoint Board. A candidate may enter for Part I. of the examination at any time after he has received a registrable qualification in Medicine, Surgery, and Midwifery. He is required to show his proficiency in such subjects as the anatomy of the eye and the neighbouring central nervous system, the physiology of vision, and elementary optics. Part II. may be taken on the completion of one year of special study of Ophthalmology, provided that certificates can be produced showing that Part I. has been successfully passed, and that the candidate can furnish proof that he has specially studied Ophthalmic Medicine and Surgery, and General Medicine in its relation to Ophthalmology for a period of twelve months. He must, further, have been engaged in the investigation and correction of errors of refraction; have attended for twelve months the clinical practice of a recognised Ophthalmic Hospital, or of the Ophthalmic Department of a recognised General Hospital, either as House Surgeon, House Physician, or Clinical Assistant, and have taken a practical course of Operative Ophthalmic Surgery and a course of Pathology and Bacteriology, with special reference to Ophthalmic Medicine and Surgery.

The regulations adopted by the University of Cambridge for its recently constituted Diploma in Medical Radiology and Electrology may be briefly referred to, as the terms differ somewhat from those just described in connection with the Diploma in Ophthalmic Medicine. Presumably to meet the requirements of men who hold a more senior position in the profession, a Dissertation is accepted from candidates who have

The Qualification of the Specialist

been qualified as medical practitioners for not less than ten years, and who have been engaged for not less than five years in the practice of Medical Radiology and Electrology in the Electrical Department of a Public Hospital, the nature of such practice being approved, in each case, by the Committee. On the other hand, there is an examination in Physics and Electro-technics for candidates who hold a recognised medical qualification, and who produce evidence that after qualification they have attended for at least three months a recognised course of lectures and practical instruction in these subjects. Part II. of the qualifying examination is open to qualified practitioners of not less than one year's standing, who have attended a course of lectures on Radiology and Electrology for at least three months and have had at least six months' clinical experience and instruction in the Electrical Department of a recognised Hospital.

In order to obtain an insight into the views of those who have studied the question of the training and education of prospective practitioners in Laryngology and Otology, it will serve a useful purpose to turn to the Report issued by the Committee representing the American Medical Association and the various Associations and Societies on the American Continent which are concerned with these specialties. Under the Chairmanship of Dr J. Gibb Wishart of Toronto, the Committee, after careful deliberation, have recommended a minimum curriculum for the guidance of those who may be seeking to become recognised as specialists in Oto-Laryngology.

Bearing in mind the necessity of a sound knowledge of general medicine, the Committee recommend as a preliminary training that the individual should practise, either as a licensed practitioner for four years, or should act as an interne or resident in a Class A. General Hospital for at least one year. He should then proceed to prepare himself for the study of the specialty by pursuing, in the Post-graduate Department of a University, the following course of study: the Anatomy of the head, neck, and thorax (including Embryology and Histology), Pathology and Bacteriology, Operations on the Cadaver, Physics, Physiology, Neurology, Hygiene and Public Health, the interpretation of X-ray Plates, the Teeth and Mouth and their Diseases and General Surgical Technic.

The above course should occupy the candidate daily for from four to five hours over a period of from six to nine months,

Editorial

the remaining portion of each day being spent in the Out-patient Clinic of an Ear and Throat Department. Subsequent to its completion, the Committee recommend that he should secure a position as resident surgeon in a Hospital specially devoted to diseases of the ear, nose and throat, or in a general Hospital with an adequate Ear and Throat Department. This period of his training should not be less than sixteen months.

While the above is suggested as a minimum course, the Committee recommend that a further period of special study should be sought in Clinics at home or abroad, in centres where opportunity is afforded of following the work of those who are devoting their time to certain special fields in the Department of Laryngology and Otology. The course of study suggested in the Report covers a period varying from three to three and a half years, if the practitioner should decide to devote a portion of his time to attending Clinics abroad.

The duration and the scope of the training outlined in these different curricula are fairly comprehensive, and are quoted here because they might form a useful working basis for those whose duty it will be to determine the period and form of study which may be required from candidates seeking the Diploma in Laryngology and Otology, should such a qualification be established by one or more of the Universities and Licensing Bodies in this country. It would be necessary, at the same time, for the Examining Boards to approve of special Post-graduate Departments, Hospitals and Clinics at various centres, where prospective candidates for the Diploma could be assured of obtaining the necessary instruction along with satisfactory clinical facilities.

It would be unfortunate if the course of training and the examination test were made of too limited a character, and restricted to the subjects which are more intimately related to diseases of the ear, nose and throat. A sound and practical education in surgery and medicine is an essential part of the equipment of every specialist, and a Diploma which carried with it evidence of such general training, would not only be a more valuable qualification, but also more in keeping with the requirements of modern practice.

A. LOGAN TURNER.

CAVERNOUS SINUS THROMBOSIS.*

By T. RITCHIE RODGER, M.D., F.R.C.S.E., Hon. Surgeon, Ear, Nose, and Throat Department, Royal Infirmary, Hull.

THE cavernous sinus, extending from the sphenoidal fissure backwards to the apex of the petrous portion of the temporal bone, fed mainly by the ophthalmic veins in front, and drained behind by the superior and inferior petrosal sinuses, is not frequently the seat of thrombosis, but when this does occur the symptoms are so striking, as a rule, as not to be readily mistakable. The bulging, immobile eyeball, with œdema and probably discoloration of the surrounding skin, the extreme chemosis of the conjunctiva and rapid depreciation of vision, combined with marked febrile symptoms, are characteristic of no other lesion. In cases complicating suppuration of the middle ear, however, the onset of these symptoms may be quite gradual, and I offer below an explanation of this fact. The following four cases occurred, as it happened, in one year, and each illustrates a different origin.

In the first case I was able to demonstrate, by a somewhat heterodox line of treatment, that the superior petrosal sinus had been *primarily* infected from the middle or the inner ear without previous involvement of the sigmoid or lateral sinuses, and as far as I have been able to find in the literature of the subject, this has not previously been observed.

The second case had a more common origin in a carbuncle on the nose. The third was of the more usual middle-ear type, where the sigmoid sinus was first thrombosed, and the process extended to the cavernous, presumably by either or both petrosals. The fourth was an example of infection following a frontal sinusitis, of which one case is included in the collected statistics of Dwight and Germain,¹ and one has been reported by Dighton.²

It is not necessary here to detail further the anatomy of the cavernous sinus, but there are two points I would emphasise. First, the anastomosis is so free between the right and left sinuses by means of the circular sinus, that thrombosis of both is probably the rule. In those cases of Dwight and Germain's

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T. Ritchie Rodger

series, where *post-mortem* results were obtainable, thrombosis on both sides was definitely stated in two-thirds. Of my cases, I obtained consent for *post-mortem* examination in two only, Cases II. and IV., and I found both sides involved in II., while in IV. the only demonstrable septic clot was on the distal side. In the other cases, where *sectio* was not allowed, the proptosis and chemosis involved both eyes, and almost synchronously. The importance of this is obvious. It is our greatest obstacle to successful direct attack on the sinus, and doubtless the explanation of most of our failures. Second, the petrosals are not merely channels for emptying the cavernous sinuses into the sigmoid sinus and the jugular bulb, but they receive blood also from small tributary veins in their course, helping to drain the triangular area of petrous bone, bounded by them and by the sigmoid. The superior petrosal (I quote from Macewen³) receives blood from the inferior cerebral and superior cerebellar veins and small branches from the tympanum, many of which issue through the petro-squamosal suture, the remainder passing through the bone directly into the sinus. The inferior petrosal receives blood from the inferior cerebellar veins, and from those of the aqueduct of the cochlea, the vestibule, and the fossa subarcuata.

The sigmoid sinus, because of its abutting directly on the mastoid cells, is the most common site of septic thrombosis, and it is undoubtedly true that most cases of cavernous sinus thrombosis of otitic origin are extensions from the sigmoid, but it is obvious that the petrosals may be directly involved by extension along the small veins referred to, and my first case is an illustration of this possibility.

CASE I.—J. D., aged 12, was first seen on 13th December 1918, suffering from sickness and giddiness of forty-eight hours' duration, vomiting irrespective of the taking of food. He was too giddy to stand and always tended to fall forwards. There was a history of discharge from the left ear two months earlier, with recurrence for one week before admission. There was thick pus in the meatus, but the perforation could not be detected after mopping. Tuning-fork, B C > A C. Conversational voice seemed to be heard at 1 foot. There was marked spontaneous nystagmus to the left; ataxia was present and swaying on doing the Romberg test. Kernig and Babinski tests negative; no headache; temperature normal; pulse 60. Cold caloric test to the left ear did not reverse the nystagmus. Dr Matheson Mackay reported both fundi normal. During twelve

Cavernous Sinus Thrombosis

days' stay in hospital, pulse and temperature were normal, the nystagmus gradually disappeared, as also the giddiness and ataxia, so that after a week he was able to be up and about the ward. The discharge also gradually diminished until at the end of a week the ear was practically dry. It seemed that the labyrinthitis had subsided, and when on 24th December he asked to get home for Christmas he was allowed to do so, to return in five days.

He was readmitted, however, on the 26th with partial facial paralysis on the same side (the left): he had vomited once since leaving hospital; neither nystagmus nor giddiness had recurred. The radical mastoid operation was performed at once, pus under pressure, and granulations being found in the antrum. The dura of the middle fossa was exposed and appeared healthy. The dura of the posterior fossa was not exposed as the symptoms did not suggest sinus thrombosis, and the sinus plate was healthy. On removing the bridge there seemed to be granulations covering the adital portion of the facial canal and the wall of the external semicircular canal, but in neither situation could a definite gap be determined. I may state here that during the whole subsequent course of the case nystagmus and giddiness remained absent and the facial paralysis continued. Three days after operation the temperature rose to 104° with a rigor, and the same happened the following day, so that I exposed the sigmoid sinus which, however, appeared healthy and was left untouched. Lumbar puncture yielded a clear cerebro-spinal fluid under normal pressure. During the next two days the same rise of temperature with rigors occurred, and I explored the sigmoid sinus with a syringe. Fluid blood was drawn off and retained for examination. The jugular vein was ligated. Next day there was no rise of temperature and no rigor, and on the following day a slight temperature was recorded, but neither rigor nor headache; by this time the pathologist's report on the blood had arrived and he had found pneumococci.

I presumed then that there was a mural septic clot in the sigmoid sinus, not extensive enough to occlude the sinus completely, and that my needle had acquired some septic material when passing through this to the blood-stream beyond, and I proceeded to open and clear this out. The blood in the sinus was now, of course, thrombosed from ligation of the jugular a few days before, but the clot was clean and no septic part adhering to the wall could be found. When this clean red clot had been scooped away, however, and the gush of blood from above had been established, just before we succeeded in stemming the latter, two small, worm-like pieces of soft blackish grey clot were washed out, just of the calibre of the superior petrosal sinus. After this the temperature still continued to rise daily to 101° and

T. Ritchie Rodger

102°, but without rigors. Three days later, *i.e.*, fourteen days after the radical mastoid operation, œdema of the face and both eyelids was noticeable. Gradually the eyes became more and more chemotic and proptosed, with limitation of the movements of the orbs. The septic thrombosis of the superior petrosal had extended to the cavernous sinus. Further operation was not suggested. Towards the end, there was incontinence of urine and fæces, but none of the cardinal signs of meningitis ever appeared. Post-mortem examination was not obtained.

CASE II.—J. G., aged 31, was admitted on 16th February 1919 with a history of carbuncle on the right side of the nose a week earlier. There were marks of several small incisions on the right side and on the bridge of the nose. There was marked proptosis and chemosis of the left eye with discoloration of the lids and of the forehead. The eyeball did not move and the sight was quite gone, even the light of a strong electric torch not being distinguished. Dr Matheson Mackay reported the retinal veins very large and dark-coloured. The right eye showed neither chemosis nor limitation of movement and had good vision. Examination of nose and throat was negative. Ears normal. Temperature 101°, pulse 78. Reflexes did not point to meningitis. Three hours later the temperature reached 104°. When seen again twelve hours after admission, the forehead and the left eyelids were quite blue and the veins stood out prominently. There was some bulging and œdema of the right eye. Babinski's test gave extensor responses on both sides. Kernig still negative. Death occurred fifteen hours after admission.

Post-mortem.—The whole of the left cavernous sinus was full of septic clot; the communicating sinus exuded liquid pus; the anterior part of the right cavernous sinus contained septic clot and the posterior part uninfected clot. The sigmoid sinuses were normal. There was no pus in the orbital cavities. In death, the œdema of the face and eyelids, as well as the proptosis, had quite disappeared. In this last detail, the case differed from one I saw in the wards of Dr Maitland Ramsay,⁴ of Glasgow, ten years ago. This case was described by Ramsay in a lecture to the Ophthalmological Congress at Oxford in 1911, and details will be found in the *Glasgow Medical Journal* of that year. The picture presented was very similar to what I have just described, but Professor Teacher's *post-mortem* report shows proptosis persisting after death, and the explanation is apparently to be found in the fact that he noted abscess in each orbit.

CASE III.—G. B., aged 12, was admitted on 6th August 1919 with temperature 105°. History of left otorrhœa of long duration; distinct tenderness over left mastoid and down the neck; no signs of

Cavernous Sinus Thrombosis

meningitis. Radical mastoid operation immediately performed. The sigmoid sinus was thrombosed and gangrenous in appearance. It was opened and evacuated and the jugular ligated. At the operation the question was raised as to whether there was not slight protrusion of the left eye. Two days later there was distinct bulging and chemosis of both eyes with a slight diminution of movement of the left. Dr Mackay reported both fundi normal. I suggested operation on the cavernous sinus, but did not press much against the parents' objections in view of the fact that both sinuses were evidently involved. The symptoms became quickly more pronounced and death took place five days after admission. *Post-mortem* was not allowed.

CASE IV.—C. V., aged 14, was admitted on 10th September 1919. He had been seen ten days earlier by Dr Legge Roe at an Ophthalmic Dispensary with swelling over the left eye, redness of the conjunctiva, and paresis of the external rectus. Three days later there was distinct swelling of the right eyelids, and a tentative diagnosis of cavernous sinus thrombosis was made: patient was advised to seek admission to the Infirmary. This advice was not followed till a week later, when he was admitted under my care moribund. Temperature was 103°, lips blue, face a dusky, livid colour, slight swelling of left eyelids, but no chemosis of either eye. An incision had been made over the left eye and a little pus came from it. Retraction of the neck was well marked; Kernig well marked; Babinski extensor. Examination of nose, throat, and ears negative. A diagnosis of lepto-meningitis was made and this was confirmed by drawing off turbid cerebro-spinal fluid. Patient died half an hour later.

Post-mortem.—A purulent exudate covered the whole of the left side of the brain and several ounces of pus drained into the basin. The lateral, sigmoid and longitudinal sinuses were normal; the left cavernous sinus showed no pus, but the circular sinus and the anterior part of the right cavernous sinus showed pus and soft thrombi. On stripping the dura from the cerebral wall of the left frontal sinus, it was found to be adherent and the bone dark-coloured. This dark area of bone was removed and exposed the frontal sinus full of thick pus and gangrenous mucous membrane. The left ethmoid cells and left antrum of Highmore were in the same condition; the sphenoidal sinus, which was a single cavity with an incomplete septum in its posterior third, contained pus, but the mucous membrane appeared healthy. The sinuses on the right side were normal.

When I examined this case I thought the previous diagnosis of cavernous sinus thrombosis was wrong, as the patient was obviously dying of a septic lepto-meningitis, and the cardinal signs of the former condition had already disappeared, as they do in death if no orbital

T. Ritchie Rodger

abscess is present to maintain the proptosis. The early diagnosis was, however, justified by the actual demonstration of the thrombosis *post-mortem*.

Treatment.—I do not wish to do more than merely mention the various methods of direct attack on an infected cavernous sinus, having no new suggestion to make. Dwight and others have approached it by turning down a bone-flap in the temporal region as in the Krause approach to the Gasserian ganglion. Grünert has suggested reaching the infected area by way of the nose and the sphenoidal sinus, and a modification of this has been proposed, using Moure's para-nasal route for more direct access to the sphenoidal. Luc has shown on the cadaver that the best line for treatment *viâ* the sphenoidal is to reach the latter from the antrum of the opposite side. Krönlein proposes in cases of frontal origin to exenterate the orbit, and reach the anterior part of the cavernous sinus through the sphenoidal fissure. Results have been most discouraging, and it seems to me that, especially in cases of otitic origin, conservative treatment deserves further consideration.

It is obvious that there is an essential difference in cases arising from infection in front as compared with those originating *à tergo*. The blood current is from the ophthalmic vein and its anastomoses backwards to the cavernous sinus, thence by the superior and inferior petrosals to the sigmoid and the jugular bulb. A septic clot forming in one of the small tributary veins in the region of the orbit or the nose may be transplanted thence to the cavernous sinus, and, in the slower current of the latter, set up septic thrombosis with rapid onset of symptoms. In middle-ear cases, however, the septic extension is against the direction of the blood-stream, and must necessarily occur forwards along a preformed aseptic clot. In other words, when cavernous sinus thrombosis occurs in connection with septic clotting in the sigmoid or petrosal sinuses, the cavernous sinus condition is at first, and for some time, one of venous stasis from damming back of its blood current by a septic clot situated in either of these other sinuses, and the cardinal signs, startling and outstanding as they always are, may be merely signs of blocking, not of sepsis, in the cavernous sinus. If this be so, is it not reasonable to suppose that some cases might be saved, and is it not probable that some of the cases of spontaneous recovery, that is, recovery without direct attack, should be so explained? Spontaneous recovery occurred in 14 of Dwight and Germain's

Cavernous Sinus Thrombosis

182 collected cases. J. S. Fraser⁵ and Dan M'Kenzie^{5a} have each reported cases, and in the *Journal of Laryngology* of October 1919, a review appeared of a case reported by Torrini.⁶ Dighton⁷ was doubtless right in attributing the recovery of his otitic case to the suction action of lavage of the jugular bulb, the septic block being aspirated from the inferior petrosal. The elaborate arrangements made by Nature to safeguard the sinuses from interference by the respiratory movements, as outlined by Macewen⁸ in his chapter on the Dynamics of the Sinuses, no doubt reduces the force of such aspiration, but it is probably quite efficient.

Similar lavage of the posterior end of the superior petrosal is not, of course, feasible, but I have demonstrated how it was effected, in Case I., by the blood current from the lateral sinus. If we have reason to think there is septic blocking of the superior petrosal, say in a case with sigmoid sinus thrombosis and early cavernous sinus symptoms, where on clearing out the sigmoid, bleeding from below demonstrates a patent inferior petrosal, would it be possible to attempt to apply suction to the superior petrosal by removing the upper sigmoid plug daily for a few seconds, instead of leaving it in position for four or five days till clotting has occurred behind it?

In conclusion, I would submit that although thrombosis of the cavernous sinus is one of the most fatal conditions met with, a sufficient number of recoveries have been recorded, without direct attack, to encourage us to use every available measure to attain that end. When dealing with a sigmoid sinus thrombosis, the most scrupulous cleansing of the mastoid cavity must be secured before opening the vein, and the greatest care observed in inserting the upper plug, so that the clot forming behind this shall remain aseptic. Every possible aid should be supplied to the patient's natural resistance—sera or vaccines, and suitable feeding. Equally important is fresh air. The physicians claim, in recent years, to have reduced the death rate in pneumonia and broncho-pneumonia by treating their cases on the balcony: the general surgeons report similar results from the same treatment of prolonged suppuration in bones. Might we not get better results in all forms of intracranial suppuration if we could adopt this simple procedure? In many of our unsuccessful cases of intracranial complications, after drainage of cerebral or cerebellar abscess, or of the meninges, or of a sinus thrombosis, the fight is so prolonged as to give one

T. Ritchie Rodger

the impression that some little advantage at some point or other of the course might have tipped the balance on the side of success. Is it not possible that treatment in the open-air might provide that advantage?

REFERENCES.—¹ Dwight and Germain, *Boston Medical Journal*, 1902.
² Dighton, *Practitioner*, March 1913. ³ Macewen, *Pyogenic Diseases of the Brain and Spinal Cord*, p. 30. ⁴ Ramsay, *Glasgow Medical Journal*, 1911.
⁵ Fraser, *Journal of Laryng. Rhin. and Otology*, March 1912. ^{5a} M'Kenzie, *Journal of Laryng. Rhin. and Otology*, February 1913. ⁶ Torrini, *Arch. Ital. di Otol.*, vol. xxx. No. 1. ⁷ Dighton, *Ibid.* ⁸ Macewen, see under 3, p. 33.

CLINICAL RECORDS

DEATH AFTER TONSILLECTOMY.

By T. B. LAYTON, D.S.O., M.S., F.R.C.S., Surgeon to the Throat and Ear Department, Guy's Hospital, London.

PERCY P., aged 32 years, was admitted on 17th January 1921 for removal of tonsils by dissection. On 18th January his fauces were anæsthetised according to the technique used by me by infiltration with 2 per cent. novocaine hydrochloride to which adrenalin had been added to make a 1.60,000 solution, and of this some 200 minims (12 c.c.) were injected. Finding, however, that his deafness prevented him responding to those instructions as to slight changes of position which are necessary for this operation, I decided to give him a general anæsthetic after the completion of the other operations for which preparation had been made. At 5 P.M. he was anæsthetised with a chloroform and ether mixture. This was about two and a half hours after the local anæsthetic had been administered. The tonsils were removed without difficulty and without undue trauma. The hæmorrhage, though free, was not excessive, but as oozing was persistent I sutured the pillars with two mattress sutures on either side. We were careful to see that the patient had completely recovered from the anæsthetic before he was removed from the operating table. These procedures had prolonged the operation, and it was then 5.50 P.M. The oozing had been sufficient to make me anxious, and at 8.30 P.M. I rang up the house surgeon to learn how the patient was; he informed me that the oozing had begun again, and that he was just going to deal with the case and would let me know how things were. At 10 P.M. I learnt that he had stopped the bleeding, but that as the man's pulse was somewhat rapid he proposed giving some saline.

I continue these notes by quoting from the report prepared for the Coroner by the house surgeon.

"I started to give the patient a general anæsthetic at 5 P.M., and it lasted for fifty minutes while Mr Layton removed the tonsils. A good deal of hæmorrhage occurred during the operation, but on putting the patient back to bed the hæmorrhage had apparently ceased. At 8.15 P.M. I saw the patient again. There was considerable oozing of blood, and the patient had become somewhat collapsed from loss of blood; he was perfectly conscious, and consented to have another operation done with a view to stopping the hæmorrhage. Under a general anæsthetic lasting for thirty minutes and given by a staff anæsthetist, I thoroughly cleaned out the throat and applied

T. B. Layton

pads to both tonsillar fossæ, kept up continuous pressure for some time, and finally painted the fossæ with a little turpentine." (These steps necessitated the removal of the sutures that had been inserted.) "The hæmorrhage then ceased, and half a pint of warm normal saline was given into the axillæ, together with a hypodermic injection of morphia, gr. $\frac{1}{4}$. After this, the patient became quieter for a time, but I saw him again at about 11 P.M., when hæmorrhage had recommenced. I then called the resident surgical officer for the week to see the patient, and he found blood oozing from the left tonsillar fossa. He applied firm pressure by means of a special clamp" (Watson William's pattern) "which was left *in situ*, and on his recommendation a second injection of morphia (gr. $\frac{1}{4}$) was given. The bleeding then ceased completely and the patient became quiet, and from this time on no fresh blood was coughed up at all. At 2 A.M. I saw him again and was satisfied with his condition; the pulse was rather weak and the face pale, but this was consistent with the fact that he had lost a large quantity of blood. The clamp was removed from the tonsillar fossa at 3.45 A.M., and no further hæmorrhage occurred. I saw the patient again at 4.5 A.M., and found that he was very collapsed; the pulse was almost imperceptible at the wrist, and the heart was beating rapidly, while the respirations were about 20 to the minute. Subcutaneous injections of ether (min. x) and strychnine (min. viii) were given immediately but they were ineffectual, and the patient died at 4.30 A.M."

Our natural deduction was at first that this was a case of "Cardiac failure brought on by Post-operative Hæmorrhage following an operation for Tonsillectomy," and such was the report sent to the Coroner. The resident surgical officer said to me next day that he wished he had done a blood transfusion, but that when he saw the patient he did not think he had lost enough blood to make this necessary.

The post-mortem was made by Dr E. P. Poulton, who made the following report:—

Lungs—Œdematous, friable, and full of blood probably aspirated down. Pulmonary arteries contained clots, one of which was seen to be bent on itself when taken out, indicating some degree of pulmonary embolism; it must have been a recent clot as the surface was quite smooth.

Heart—Large. Right ventricle full of blood. Muscle good. Aortic valve showed vegetations, two cusps of the valves being adherent to each other. Acute infection on the top of chronic endocarditis. The valves were also hard and thick. There was aortic stenosis.

Aorta—Minute trace of atheroma in thoracic aorta.

Kidneys—Old infarcts in both. Retention cyst in left.

Death after Tonsillectomy

Manner of Death—Viscera not blanched, which suggests that death was not due to hæmorrhage but to embolism.

It is easy to raise a thousand criticisms upon a case such as this; but no one, however zealous, can put forward so many as he who has been in charge of the case. It is far more difficult to put the finger on any one point at which a different action would with certainty have led to a different result; and while the writer wishes to discuss certain mistakes that were made in the case, he is unable, after profound thought, dogmatically to state that the avoidance of any one of them would undoubtedly have turned the scale.

If there be any such point, it is probably in the removal of the tonsils two and a half hours after an infiltration by novocaine and adrenalin into the surrounding tissues. Hajek used to teach that adrenalin should never be injected with the local anæsthetic in this operation, and the writer refrained from doing so until he learnt that its use was the routine with some surgeons. In ordinary circumstances he has had no reason to regret it. Even where some delay has occurred, so that the anæsthetic effect is already passing off when the operation is completed, the hæmostatic effect is good, and it would appear that the clot is firm in the cut vessels before the constrictor effect has passed away. Two and a half hours is, however, a longer lapse of time than is usual if the tonsils are removed without a general anæsthetic, and it is very probable that the operation was performed in this case at the period in which the constrictor effect of the solution had passed off and left the vessels relaxed, with a loss of tone in their muscular coats. It would seem that if after infiltration with a local anæsthetic general anæsthesia is found to be necessary and cannot be administered at once, it would be well to defer the operation to another day.

Though the performance of the operation at this moment may have been the turning-point in the case, it was not solely responsible for death. The man did not die of collapse from hæmorrhage; the total amount of blood lost was not so great as to kill even a man of his diminished vitality. Though in the report to the Coroner he is described as having lost "a large quantity of blood," the total amount cannot have exceeded 100 c.c., or at the outside 150 c.c. A young surgeon with experience in cases of hæmorrhage seen during the past few years in France did not think, five hours before death, that the

T. B. Layton

patient needed a blood transfusion. The pathologist found the "viscera not blanched," and thought that the embolism rather than the hæmorrhage was the cause of death. Are we then to consider that embolism occurred in a patient who had already caused us anxiety from hæmorrhage, or must we link the hæmorrhage with the embolism and so make the former a remote though not the immediate cause of death?

Before I consider the answer to this question, I would draw attention to the way in which the case exemplifies the principle that a sudden change of plan may lead to a disaster. The man was placed upon the table and a cursory examination of the chest was made, but it was never discovered that he was suffering from aortic stenosis. Had we intended from the first to perform the operation under general anæsthesia, a more careful physical examination would have been carried out, the cardiac lesion would have been discovered, and the indications for operation reconsidered; in this case probably no operation would have been done. Not that the cardiac condition need be considered as a necessary contra-indication to operation; the physicians of to-day are asking us to remove the tonsils in cases of endocarditis, and were a physician to ask me to do so in such a case again I should not hesitate. It may even be that if this man had had his tonsils removed some months before, the acute endocarditis which was found upon the thick adherent valves would never have arisen.

To return to the question put in a former paragraph. I do not think it right to assume that the embolism was an accidental occurrence in a person who had had some hæmorrhage; we must consider that, in some way, the latter was the cause of the former in whole or in part. Loss of blood causes a fall of blood pressure, and thus a lessening of the coronary circulation. This results in a weakening of the heart's beat, and so the blood courses more slowly through the system. Now we must concede that a fall of blood pressure is more likely to impair the force of the heart when this is damaged than when it is healthy, hence in this case the blood would have flowed more slowly even than it would have done in a healthy person after the same loss of blood. It is the sluggishness of the stream which provides the factors essential to the intra-mural clotting of the blood, or the accretion of further clot to one already circulating in the blood-stream. Suppose that the clot originated in one of the venules in the tonsillar area that had been cut during the

Death after Tonsillectomy

operation, under ordinary circumstances it would have passed so rapidly through the heart into the lung that, at the most, it would have caused an infarct in that organ; but in this debilitated man with the stream flowing slowly as the result of loss of blood it was delayed in its passage through the jugular vein and auricle, passed into some back current among his cordæ tendiniæ, and then being increased in size during its wanderings rushed into a larger pulmonary branch. There are some who say that these emboli form usually in the auricular appendix among the musculæ pectinatæ of this part; if this be so, we have the slowing of the stream arising from the loss of blood alone to account for the formation of the clot.

It has been said that there is always a bleeding-point to account for tonsillar hæmorrhage. In this case I did not find it. I do not think the statement correct. I am willing to admit that the more carefully you search for such a point, the more often are you likely to find it. I am willing to admit that such a point may be there even if you do not find it, but in such cases a gush from some area of the cavity is evidence that it is there. In this case there was no such gush, and I believe the hæmorrhage was a general ooze from arterioles and venules. It has been further said that deaths from hæmorrhage would not occur were the surgeon always to secure the bleeding-point before the patient leaves the table, but this does not cover those occasions where bleeding occurs after the patient has come round from the anæsthetic during the period of reaction. I think that this case teaches that control of a bleeding-point during the operation does not cover the whole question of hæmorrhage in tonsillectomy.

It also offers an answer to the question that is sometimes put, whether suture of the pillars of the fauces will always control such hæmorrhage, for it shows that it does not. I believe that this point is closely connected with the last. For when there is a bleeding-point in the tonsillar bed upon which it is difficult to put an artery forceps, a mattress suture which includes the area from which the bleeding is coming will stop the hæmorrhage, and will stop it at once. In this case the suture did not at once stop the bleeding; when the left fauces had been sewn up the right tonsil was removed, and when this was accomplished there was still an ooze from the left side. I would suggest that for arrest of hæmorrhage from a single bleeding-point, suture of the pillars is efficacious when the suture

T. B. Layton

controls the point, but that in the case of a series of minute bleeding-points which constitute an ooze, suture by itself is insufficient. It is probable that in this case the proper thing to have done was to have plugged the tonsillar cavity with a roll of gauze, and to have sutured the pillars across it. One other thing might have been done, to have stood the patient up after he had recovered from the anæsthetic and, by allowing him to faint, to have called more fully into play the natural arrest of hæmorrhage. It is since the occurrence of this case that my attention has been called to the great importance of this point by Dr Logan Turner.

There remains for discussion the question whether some deficiency in the clotting power of the blood was a factor in the case. American writers have recently urged that the coagulation period of the blood should be estimated in every patient before a tonsillectomy is done, in order to know when one is dealing with those rare cases in which a deficient coagulation power of the blood may endanger the life of the patient. In this case the possibility is excluded by the fact that the man died from a thrombus passing into his lung. It would seem that the condition is so rare that the routine examination of the blood for this purpose is a process, the labour of which is out of all proportion to the result to be obtained. No such case has been published in this country among the thousands of operations that have been done. Deaths have occurred from tonsil operations, and most of these cases are exhaustively discussed after careful investigation, but so far as the writer knows, deficient coagulation has been the cause of death in none of them. Series of 18,000 and 14,000 tonsil operations have had references made to them of late without this complication being met with.

REFERENCE.—“Blood Examination in the Surgery of the Nose and Throat,” Dr Seymour Oppenheimer and Dr Mark J. Gottlieb, New York City, *Laryngoscope*, vol. xxix. No. 7, July 1919.

Foreign Body in the Œsophagus Removed

A FOREIGN BODY IN THE ŒSOPHAGUS REMOVED BY EXTERNAL ŒSOPHAGOTOMY. CURE.*

By J. N. ROY, M.D., Physician to the Hôtel-Dieu, Montreal ; Laureate of the Academy of Medicine, France.

THE case of a child, four years of age, with a foreign body lodged in its œsophagus for nearly fourteen months, and which had resisted two attempts at removal by the ordinary direct methods, presents, it seems to me, a subject sufficiently interesting to justify a description.

CASE REPORT.—On 10th April 1919 H. S., aged 4, was brought to the Hôtel-Dieu Hospital on account of a foreign body which had lodged in the œsophagus. The mother stated that on 4th March 1918 the child had swallowed an iron washer, and as he complained of pain in the throat, his grandmother, in attempting to remove the cause of the trouble, put her finger into the child's mouth and only succeeded in pushing the foreign body further down. There was no interference with respiration. The child was able to swallow liquids and semi-solids, but solid food was rejected. A physician who was consulted prescribed a purgative.

During the ensuing nine months nothing special was noted in the condition of the boy, except a little constipation, and an increasing difficulty in swallowing. No pain was complained of.

Towards the end of December a surgeon who was consulted requested an examination with X-rays, and by this means the foreign body was located above the level of the clavicles. Under chloroform the surgeon introduced the Kirrison hook into the œsophagus, but all attempts at extraction were fruitless, the instrument failing even to touch the foreign body. Œsophagoscopy was then advised, but the mother decided to take the child home, promising to return later.

On 10th April 1919 the child began to swallow liquids with difficulty, and he was brought to the Hôtel-Dieu Hospital, where I saw him for the first time. A second radiograph, taken the previous day, showed that the foreign body was still in the supra-sternal region. I proposed that an œsophagoscopic examination should be made, and this being accepted, it was carried out on the following morning.

Chloroform was administered and the tube was passed until it came into contact with an area of granulation tissue which commenced to bleed at the slightest contact. Adrenalin diminished the hæmorrhage. The granulations were so numerous that it was

* Read before the Canadian Medical Association, Quebec, June 1919.

J. N. Roy

impossible to see the foreign body. As the wall of the œsophagus, where it had been in contact with the iron washer for more than thirteen months, seemed to be very diseased, gentle manipulations were necessary. A pair of forceps was introduced into the tube, and by slight movements I was able to touch the foreign body. It was not difficult to take a firm grip of it, and I slowly withdrew the œsophagoscope and the forceps. After having displaced the washer and moved it a short distance, it became wedged again, and offered marked resistance to all further efforts at removal. In order to avoid tearing the œsophageal wall, I decided to make no further attempts and withdrew the instruments.

The child's mother was then informed of the exact situation and external œsophagotomy was proposed and accepted. The operation was performed on 24th April.

Operation.—The patient was again put under chloroform and the head, held in extension by means of a bolster placed under the shoulders, was slightly turned to the right. On account of the well-known anatomical fact that the œsophagus extends a little to the left aspect of the trachea, I operated on that side and by the lateral way, which is the most rational. The incision along the inner margin of the sterno-mastoid muscle extended from the sternum to the cricoid cartilage. The deep vessels and nerves were exposed and drawn outwards by means of a retractor. By dissection, the omo-hyoid muscle was exposed and raised. The left lobe of the thyroid gland was not an obstacle. In order to facilitate the location of the œsophagus, the caliber of which was small on account of the tender age of the patient, a bougie was introduced into the mouth and gently passed down the lumen. The left recurrent laryngeal nerve having been exposed and protected, an opening 22 mm. in length was made into the œsophagus, near its posterior aspect. The bougie being removed, the foreign body was sought at the spot located by the X-rays. I could plainly see the granulations, which bled at the slightest contact even with the use of adrenalin, but I could not find anything more. The left index finger was then inserted into the œsophagus through the cervical incision, and it immediately felt the iron washer which was pushed back into the mouth, to be seized and removed with the right hand. After disinfection of the hands I inserted into the left nostril, for feeding purposes, a Nélaton tube which reached to the stomach, and which was firmly attached at the back of the head with a point of support at the ears. Contrary to the views of a majority of surgeons, whose counsel is not to suture the œsophageal wound, but to let it heal by granulation, I preferred to close it with a continuous suture of catgut, after making sure that the place corresponding with the incision was not diseased. To this

Foreign Body in the Œsophagus Removed

suture I added three deep stitches to support the œsophagus, after isolating the recurrent laryngeal nerve: I closed the wound with silk-worm gut and placed a drain at the most dependent point. As a matter of prudence, I bound the hands of the patient.

The foreign body measured 23 mm. in diameter and weighed 5 grams. It was not symmetrically round, and at the point where it was soldered there was a cavity whose edges were bound by a sharp point, about which I shall have more to say later on.

The outcome of this operation, which I succeeded in performing entirely with a knife, and without applying a ligature to any of the blood-vessels, was very successful. The child was nourished on liquids by the Nélaton tube, and was kept in bed in a horizontal position. The first dressing, changed at the end of forty-eight hours, was hardly soiled. However, during the following days the secretion became a little more abundant and thick. There was never any fever, and by the beginning of the second week the secretion had diminished, and the drain was removed. The nasal tube was withdrawn in its turn, two weeks after the operation. On 3rd June the child was completely cured and was able to return to his home. He is now able to eat solid food without the slightest difficulty.

In a previous article * I have had occasion to discuss, at some length, diseases of the œsophagus and their treatment, so that I need not say anything further on the subject at present. I shall merely be satisfied with drawing attention to the interesting points which are contained in this case. It is well known that the mortality, after external œsophagotomy, is very high, and has exceeded 40 per cent. when intervention has been delayed for a long time after the accident.

The age of the patient in the present case is the first thing that is striking—he was only four years old—and next is the fact that the foreign body he had swallowed had been in the œsophagus for nearly fourteen months. The uncontrolled attempts made by the surgeon to extract the washer with a Kirrison hook, while being imprudent, might have become disastrous, for, handled a little roughly, the instrument would have perforated the œsophageal wall and caused a secondary suppurative mediastinitis. While performing œsophagoscopy, I did not wish to remove the granulation tissue in order to enable me to see the foreign body, for fear of increasing the

* J. N. Roy, "De la Nécessité de l'œsophagoscopie pour le Diagnostic et le Traitement des Affections de l'œsophage," *L'Union Médicale du Canada*, février 1919.

James Adam

existing injuries, and, after having taken hold of the washer and moved it on a course of about 4 cm., the movement was arrested as soon as I felt it was again wedged. The wedging was easily explained when I came to examine the points of the iron washer, and its condition made it manifest that I would have torn the œsophagus had I persisted in my efforts to extract it.

The technique employed in external œsophagotomy followed very closely that recommended by the majority of authors, and if in this instance I have achieved success, I attribute it :—

First—To the great care I have exercised in my dissection.

Second—To the very small incision made in the œsophageal wall, and to its immediate closing.

Third—And finally, to the Nélaton tube passed through the nostril, which permitted me to feed the patient, and to reduce to a minimum the dangers of infection from the cervical wound with its possible complications.

INFECTION OF THE MIDDLE EAR AND EXTERNAL AUDITORY MEATUS FROM VINCENT'S ORGANISMS.

By Dr JAMES ADAM, Gläsgow.

THE note by Wingrave and Archer Ryland in the *Journal* for January tempts me to refer again to my own experience of over thirty cases of Vincent's infection, which goes mainly to confirm what I have formerly stated.

Of the total cases, only one was an adult, the rest being children of the Dispensary class. The condition has always seemed to me to be one associated with neglect, and to be a graft upon a previous pyogenic infection of the middle ear, as evidenced by the history of the case, the appearance of the patient, and the carelessness as to treatment.

In typical cases the diagnosis can be made from the clinical facts. The microscope, of course, was always appealed to, and only rarely did it fail to confirm it. The main points are, the appearances, tenderness, and fœtor. The meatus is lined with granulations which may be firmly spread like a carpet or be much more profuse, bleeding at touch and inter-

Infection of the Middle Ear, etc.

spersed with tiny shreds of greyish membrane. Tenderness of the meatus is pronounced, and in these refractory little patients treatment is difficult. Fœtor is marked, though probably not distinctive.

In less typical cases the granulations do not line the whole meatus or they may be little in evidence, but there is always a peculiar rawness round the external orifice; this, with the fœtor and tenderness and the absence of thick, profuse pus, should make one suspicious. The disease does not seem highly infectious; in only one family were there two cases.

Treatment is difficult, partly because of the pain caused by attempts at cleansing, partly because of the attendant's carelessness. A preliminary application of Blegvad's solution overcomes the tenderness, and in one case seemed of itself to effect the cure. It can be followed by such applications as Arg. nitrat. 5 per cent. in spt. æther. nitros.=2 per cent. picric acid in spt. vin. rect. or of plumb. acetat., one grain in one ounce of spirit. Treatment must be varied; it is often tedious and disappointing owing to carelessness. With the disappearance of the Vincent's organisms, the primary pyogenic infection may, or may not, yield to treatment. In two cases a mastoid operation was necessary. A number of cases would not continue treatment.

REFERENCES.—*Scot. Soc. of Laryngology and Otology*, June 1914.
British Journ. of Children's Diseases, February 1915.

CRITICAL REVIEW

THE TONSIL AS A FOCUS OF INFECTION IN CHRONIC ARTHRITIS.

By W. M. MOLLISON, M.Ch., Guy's Hospital, London.

THERE is nothing new under the sun! Focal infection as a cause of chronic arthritis is now established and has been so for some fifteen or twenty years, but more than one hundred years ago it was recognised by Dr Benjamin Rush.

Captain Pleadwell in a letter to the *Journal of the American Medical Association* quotes what is probably the earliest observation on focal infection in arthritis; in his *Medical Enquiries and Observations*, dated 1801, Dr Rush records the case of a young woman with rheumatism in the hip whose pain was completely removed by the extraction of decayed teeth. He goes on to emphasise the importance of removing all carious teeth whether painful or not in cases of rheumatism.

The teeth still hold the first place in the list of septic foci, and X-ray examination has established this position, revealing as it does septic conditions about teeth that to the naked eye show no disease. Evidence collected from many sources goes to show that the tonsil must come under suspicion, coming next in importance to teeth in supplying the focus of infection in cases of fibrositis, myositis and chronic arthritis: certainly in younger patients the tonsil holds a more important place than teeth.

British writers are much more cautious than American in their statements as to the importance of the tonsil. Jones-Llewellyn and Bassett-Jones in their work *Fibrositis* only mention tonsillitis as predisposing to relapses; Jones-Llewellyn in his *Arthritis Deformans* believes "the etiological importance of throat infections in rheumatoid arthritis is underestimated"; under the head of treatment he advises that the teeth should be attended to first, and later "in any case of rheumatoid arthritis in which recurring attacks of tonsillitis have been followed by exacerbations of the joint condition, it would seem justifiable to advocate excision as a prophylactic measure against future attack."

In his recent works Dr Llewellyn is insistent on the etiological importance of the tonsil in chronic arthritis; indeed, he devotes considerable space in *Gout* to a discussion on the rôle of the tonsil in providing the source of infection for this as well as other forms of chronic arthritis.

Tonsil as a Focus of Infection

There are some cases in which it is certain that the tonsil can be singled out as the cause of the arthritis; thus the arthritis began after a tonsillitis, and each fresh attack gives rise to an exacerbation of the joint pains and swelling of the inter-phalangeal joints.

In others the tonsil only comes under suspicion because, perhaps, no other focus can be found; in such cases there may be no history of sore throats at any time, sometimes sore throats used to occur but have not done so for many years.

There are degrees of septicity in tonsils; some show crypts each containing septic material, but generally, it is necessary to evert the tonsil from its bed by pressure with a tongue depressor on the lower part of the anterior pillar of the fauces to demonstrate the contents of the crypts.

In almost all cases small pieces of white matter can be expressed from the supratonsillar fossa, but these are not to be regarded as infective; in some cases instead of this cheesy material, liquid pus, which is a definite indication of sepsis, can be expressed. Some tonsils are the seat of localised abscesses; these may be foci of general infection but more often produce local symptoms only. Large spongy tonsils are to be regarded as foci, whether projecting into the pharynx or buried between the pillars of the fauces. Often from small flat buried tonsils pressure will cause pus or white cheesy material to ooze from several crypts; perhaps this *par excellence* is the "septic tonsil." There still remain tonsils that are under suspicion of furnishing the infection but from which no naked eye evidence can be obtained; the laryngologist can only state that negative evidence does not exclude the possibility of infection from the tonsil, since bacteriological examination of all removed tonsils demonstrates the presence of organisms.

American writers express no doubt as to the position of the tonsil; Osler and M'Crae state that "mouth and throat take first place. The teeth and tonsils, nose and sinuses . . ."

Lillie and Lyons, in a paper on "Results of Tonsillectomy in Arthritis and Myositis," say "that the tonsil is a focus of infection in cases of myositis and arthritis is common knowledge and will not be discussed in this report."

That the tonsil can supply the organisms that cause arthritis has been proved by animal experiments. Inoculations of the organisms from the tonsil caused arthritis, and further inoculations of the cultures from these affected joints caused similar arthritis in other animals (Pybus, Beattie, and Yates).

The question as to what is a septic tonsil is not really one that can be answered clinically, or indeed bacteriologically, to judge from recent careful work on tonsil crypts. From a very tender age up to old age

W. M. Mollison

the crypts contain streptococci, and it is stated that "much of the fluid material expressed from tonsils, commonly called pus, is not purulent on microscopical examination." Further, there are some kinds of bacteria which are unable to live in the tonsil (Davis). If this be accepted, the difficulty of deciding as to whether any particular tonsil is the infecting focus is greater than ever, and the surgeon will have to rely on experience and his knowledge of the type of tonsil and case that improves after removal. It is comforting after this to turn to the work of Rosenow; he showed that strains of streptococci produce changes in muscles especially near their attachments—myositic nodules; that inoculations from these nodules into animals induced identical muscular lesions in a rabbit.

Hay found that the *Streptococcus viridans* was capable of producing or was present in cases of arthritis not accompanied by swelling and fever. Pilot and Davis found that 97 per cent. of tonsils contain *Streptococcus hæmolyticus* in their crypts, and that in 60 per cent. of the cases the same organism was present in the pharynx. After efficient removal only 15 per cent. of cases showed the streptococcus in the pharynx. They emphasise the importance of complete removal, as even a very small piece of tonsil left behind ensured the finding of the streptococcus.

This observation is borne out by clinical experience. The following case is one in point:—Mrs T. suffered from chronic arthritis; her tonsils were removed; she improved but did not get well. From the bed of one tonsil a cultivation was taken and a vaccine prepared. After each dose some improvement followed; nevertheless the disease progressed and walking became more and more difficult. A fresh examination of the throat showed in the bed of the right tonsil a small nodule of tonsil about .5 cm. in diameter; from this, septic matter could be pressed. The nodule was removed, and in a few weeks all joint pains had ceased and in three months' time the patient was perfectly well.

Although it is so important to remove all foci of infection in chronic arthritis, removal is only to be looked upon as one step in the treatment; there are underlying changes in metabolism in these cases of which only an outline is as yet fully understood. Pemberton has found a lowered sugar tolerance in chronic arthritis, and on disappearance of the arthritis a return to the normal tolerance. He makes the suggestion that the rarity of arthritis among diabetics may be in some way analogous. Any increase in the metabolism tends to diminish arthritis; does this fact throw light on the observation that chronic arthritis is not seen in the tropics?

It is obvious that the problem of chronic arthritis is so complex that cases must pass through the hands of a physician for full

Tonsil as a Focus of Infection

investigation before the tonsil can be singled out as the infecting focus: the case will then be referred to the laryngologist for an opinion.

The question then to be answered is whether the tonsil is septic. Bacteriologically this can be answered in the affirmative but clinically it is not so easy.

Results.—It must be remembered that there is in all cases a tendency for the disease to come to a standstill spontaneously, so that too much cannot be claimed for improvement following at long intervals after the removal of tonsils.

Though the tonsil plays an important part in the production of arthritis in children, the accessory nasal sinuses may be of equal or even greater importance. Byfield and Watson-Williams both emphasise this point.

Bardes in a general discussion stated that he had never seen harm result from removal of the tonsils in cases of arthritis but usually good.

Chapman found that 50 per cent. of cases treated at the Stanford University clinics by removal of foci of infection, showed definite improvement. The most striking results were obtained when the foci were in the genito-urinary tract. Rapid recovery followed treatment of the teeth. Removal of tonsils in several cases was followed in a few days by loss of pain, and later, by return of function in the injured joint.

There is no question that removal of tonsils in early cases of arthritis and in cases of myositis and fibrositis and "neuritis" gives brilliant results. Lillie and Lyons found that of patients under 30 suffering from myositis and arthritis, 81 per cent. were improved as a result of tonsillectomy. Nordlund states that good results are obtained both in cases of arthritis and nephritis.

The following is a typical case of fibrositis:—W. H. P., aged 42, suffered from pains in the limbs for eighteen months; these pains began in the wrists, then attacked the arms, and later the leg. The disability was of such severity that the patient had been unable to continue his work which was that of a dental surgeon. The onset of symptoms followed a quinsy. Many forms of treatment had been tried, including a voyage of three months to Jamaica. The right tonsil was found buried and septic, the left was flat. The tonsils were enucleated, and in four weeks the patient was back at work having lost all pain.

The age of the patient does not affect the question of operation, except in so far as taking all usual precautions against post-anæsthetic complications is concerned; this is particularly important since patients with advanced arthritis may have fixation of the chest and spine, and so be unable to dispose of blood after operation. One of the most

W. M. Mollison

satisfactory cases was that of a woman of 64; she suffered from arthritis in one wrist for several months; after the removal of the tonsils she lost all pain, and indeed the wrist returned to its normal supple condition. The rapidity of improvement is very striking in some cases; cases may lose pain in a few days. A medical student was the subject of chronic arthritis affecting the wrists, interphalangeal joints and arms. The tonsils were removed and in three days all pain had ceased, and recovery was complete and permanent.

It is important to curb enthusiasm over the results in older patients, and particularly in the case of patients whose joints show bony changes on X-ray examination. At the same time, even in older patients, attacks of pain may be greatly lessened by removal of obviously septic tonsils. Gibney, speaking as an orthopædic surgeon, urges the importance of finding the septic focus and of preparing a vaccine from the tonsil, but he warns against expecting too much. He adds that subsequent orthopædic treatment is important.

Even in advanced cases improvement follows, pain may diminish, though considerable deformity, however, is present. The following is a good example:—A man, aged 46, had suffered from extensive arthritis for six years; there was great deformity of the wrists, the hands could not be clenched, arms were stiff and, in addition, the patient had attacks of severe pain that prevented work, three or four attacks occurring each winter. The urine contained a slight amount of albumin. The teeth had all been extracted with but slight improvement; the tonsils were septic and were enucleated early in 1918. For two years the patient remained practically free from pain and was able to continue his work uninterruptedly, though the joint deformity was as before. Incidentally the urine became free from albumin. Later, after a strain, fluid collected in one knee-joint, but the attacks of pain have not recurred.

Instances are known of disappearance of slight deformity. No doubt these are not bony deformity but thickenings in tendons above the joints. A nurse, aged 52, used to suffer from slight pains in the feet and hands. Three years before examination she developed a very severe multiple arthritis after what appeared to be ptomaine poisoning in Egypt; this had all cleared up except in the hands. The wrists were stiff and painful, and it was difficult for the patient to follow her occupation as a nurse. While training she used to suffer almost always from septic throats and often had laryngitis; the tonsils were small but septic and were removed. After operation there followed an exacerbation of the pains in the wrists, but in a few months all pain ceased and she returned to nursing. Before operation there was some localised swelling on the extensor aspect of the right wrist, but this disappeared within a few months.

Tonsil as a Focus of Infection

Stated broadly, the present position of opinion on the subject of tonsil infection as a factor in chronic arthritis is:—

- (a) The tonsil certainly supplies the focus in a large percentage of cases of fibrositis, myositis, and arthritis; the figure is a good deal higher in the young than in the old.
- (b) The earlier the tonsil is removed, the better the result, though even advanced cases benefit. Pain may be relieved though deformity remains; and in some cases deformity is reduced.
- (c) The tonsil must be completely enucleated as even the smallest nodule left may perpetuate infection.
- (d) When deformity exists removal of the tonsil must be followed up by orthopædic treatment.
- (e) Cultivations should be taken from the tonsil after removal and a vaccine prepared though it may not be necessary to use it.
- (f) Cases showing bony changes on X-ray examination are the least favourable for operation.

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SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

May 2, 1919.

President—Dr JAMES DONELAN.

Sarcoma of the Tonsil—Mr G. W. DAWSON.—A man, aged 38, who had been treated by operation and subsequent application of radium.

Pituitary Tumour treated by Sellar Decompression—Mr H. L. WHALE.—The symptoms were increasing lethargy and persistent headache. A wide and deep pituitary fossa could be seen in radiogram. Optic atrophy and bitemporal hemianopia were present. Access was obtained by Moure's incision. Some endotheliomatous tissue was removed. The patient improved; the lethargy and headache had disappeared.

Mr TILLEY approved of the method of approach by lateral rhinotomy.

Adhesions and Contraction of the Faucial Pillars, following Complete Enucleation of the Tonsils—Dr IRWIN MOORE.—There was no damage to the pillars at the operation, but subsequent contraction and adhesions have prevented the patient from singing, as she is unable to take high notes.

Mr CYRIL HORSFORD thought that the trouble could be cured by a sound method of voice training.

Dr MOORE suggested that singing lessons should be resumed after enucleation of the tonsils, so as to exercise the palate muscles and thus prevent contraction.

Paralysis of the Left Vocal Cord—Dr JAMES DONELAN.—Woman, aged 49, suffered from dysphagia and weakness of voice. The left cord was in the cadaveric position.

Drs DE HAVILLAND HALL and DUNDAS GRANT regarded the case as one of mediastinal growth.

Dr DONELAN thought that it was a case of aneurism.

(Since the Meeting the patient died and *post mortem* revealed cancer of the œsophagus.)

Royal Society of Medicine

Two Cases of Epithelioma of the Pharynx successfully treated by Diathermy—Mr NORMAN PATTERSON.

Mr TILLEY remarked that the results were excellent and that there was less shock and loss of blood than with ordinary surgical methods.

Tumour of the Base of the Tongue—Mr DAWSON.—There was a hard lobulated swelling, and the symptoms were difficulty of swallowing and alteration of the voice.

Dr DUNDAS GRANT thought that the growth was a mild form of endothelioma and that it was too irregular to be an ordinary thyroid tumour.

Mr DAWSON regarded it as an aberrant thyroid.

Mr E. D. D. DAVIS referred to a similar, though more advanced case, in which there was complete double ophthalmoplegia and blindness.

Dr JOBSON HORNE said that these growths were not malignant as ordinarily understood, in that they did not kill by metastasis but by direct extension.

Discussing radium treatment, Mr TILLEY said that he had never seen it cure epitheliomata, but that the nearer a malignant growth approached to embryonic tissue, the better was the result to be obtained from radium.

Several members mentioned their experiences with colloidal copper, but the balance of opinion was unfavourable.

Sarcoma of the Tonsil—Mr W. M. MOLLISON.—A. W., aged 22, complained for nine months of neuralgia of the upper jaw and swelling of the neck. In the right tonsil region is a tense swelling, the nasopharynx is blocked, and there is a mass of enlarged glands about the angle of the jaw. Wassermann reaction is positive, but no improvement has followed a dose of novarsenobillon.

Mr STUART-LOW suggested diathermy, and Mr DAWSON spoke of a case treated by excision and radium. Mr MOLLISON said that in spite of the positive Wassermann he regarded the case as malignant.

Extensive Lupus—Mr E. D. D. DAVIS.—The disease had commenced in the larynx and had spread to the nose and later to the alveolus and palate.

Chronic Osteomyelitis of the Maxilla of Dental Origin—Mr G. W. DAWSON.—A large sequestrum of the right alveolus had been removed, and a Caldwell-Luc operation performed.

Societies' Proceedings

Tuberculous Laryngitis—Mr T. B. LAYTON.—The exhibitor wished the opinion of members regarding local treatment.

Dr JOBSON HORNE said that the larynx should be left absolutely alone, and the man treated by silence, in suitable surroundings.

Painless Swelling of the Floor of the Mouth and Submaxillary Region, probably Actinomycosis—Dr JEWELL.—A male, aged 59. There were no enlarged glands. The Wassermann reaction was negative.

A Case of Delayed Breaking of the Voice in a Youth of 18—Dr JOBSON HORNE.

Several members suggested that the condition was allied to functional aphonia and could be cured by adopting a correct method of voice production.

A Tongue Case for Diagnosis—Mr HARMER.—The patient had difficulty in articulating. The tongue is shrunken and cannot be protruded. No glandular enlargement. Wassermann reaction negative.

The general opinion was that the disease was epithelioma.

Dr IRWIN MOORE demonstrated the normal histology of the vocal cord and ventricle of the larynx, in connection with the development of adenomata (see *Journal of Laryngology*, March 1920, p. 65).

Dr JOBSON HORNE remarked that the possibility of adenomatous growth of the vocal cords depended upon what tissue was included in the term "vocal cord." If the vocal cord is only that part which is covered with squamous epithelium, then adenoma cannot arise from it. But if the gland-bearing area be regarded as part of the vocal cord, there is no reason why adenomata should not be found here. An exact knowledge of the histology of the larynx is most important for the correct understanding of laryngeal diseases.

June 6, 1919.

Large Submucous Lipoma of Palate and Pharynx—Mr HERBERT TILLEY.—Tumour removed from a girl aged 15. The appearance recalled a large quinsy, though the mucosa was normal. It was tense and semi-solid, and displaced the tonsil downwards. The technique of removal was that of enucleation of the tonsil by dissection after laryngotomy. Hæmorrhage was slight. The tumour measured $2\frac{1}{2}$ inches in diameter.

Dr JOBSON HORNE recalled a similar case, and Mr NORMAN PATTERSON had seen a retropharyngeal lipoma which had been mistaken for retropharyngeal abscess.

Royal Society of Medicine

Dr IRWIN MOORE said that Professor Shattock read a paper on submucous lipomata before the Pathological Section in 1909. The present case was almost unique.

A Suppurating Dermoid Cyst—Mr TILLEY.—Cyst removed from the lower central region of the forehead.

Cyst of the Larynx, and Carcinoma of the Right Antrum and Orbit—Mr NORMAN PATTERSON.—The latter was treated by excision, radium, and X-rays.

A Specimen of Cyst of the Larynx was exhibited by Dr JOBSON HORNE.

Mr STUART-LOW recommended galvano-cautery as the best treatment.

Several members suggested that this might be a thyroglossal cyst.

November 7, 1919.

President—Mr E. B. WAGGETT, D.S.O.

Prolonged and Obstinate Functional Aphonia—Dr DAN MACKENZIE.—A young woman cured by hypnotism, after failure of the usual methods.

Dr BURNETT RAE described his method of hypnosis in this and similar cases.

Mr STUART-LOW said that the patient had been anæsthetised, and that this may have had more to do with the recovery of the voice than the hypnotic treatment.

Intra-tracheal Tumour removed by Peroral Tracheoscopy (*Journal of Laryngology*, Jan. 1920, p. 1)—Mr HERBERT TILLEY.—After being "gassed" in 1918, the man, aged 34, suffered from increasing dyspnoea, and lately from cough and hæmoptysis. The growth could be seen by laryngoscopy, when the Killian position was assumed. It grew from the junction of the trachea with the left bronchus, and was pedunculated.

Professor SHATTOCK regarded the tumour as papillary granuloma, probably growing on the site of an ulcer of the tracheal mucosa, caused by the mustard-gas.

Dr JOBSON HORNE regarded the tumour as a papilloma which had been present before the gassing took place.

Dr IRWIN MOORE said the bleeding made the operation very difficult, but the blood was prevented from entering the lungs by

Societies' Proceedings

the use of intra-tracheal anæsthesia by Kelly's apparatus, the catheter being passed beyond the growth. Primary growths of the tracheal bifurcation are very rare, and only nine benign growths of this region are recorded in literature.

In reply to Dr Horne, Professor SHATTOCK stated that before the gassing the patient had no history of any tracheal obstruction.

Mr SYDNEY SCOTT and Dr IRWIN MOORE demonstrated instruments for suturing the faucial pillars in cases of hæmorrhage after tonsillectomy.

Epithelioma of the Tongue, with Secondary Glandular Deposits, treated by Amino-propionate of Copper—Dr JAMES DONELAN.—The patient, a man aged 65, suffered from a large inoperable cancer. He was treated by injections of amino-propionate or alanin of copper, as suggested by Dr Shaw Mackenzie, and the improvement has been remarkable. The exhibitor suggested that this was due to a diminution of the inflammatory zone surrounding the cancerous tissue.

Dr IRWIN MOORE had seen improvement in similar cases from the use of colloidal copper.

Dr DONELAN gave further details regarding the drug, so that members might try it for themselves.

Statistics bearing upon the Sex and Age Incidence of Carcinoma of the Post-cricoid Area—Dr A. LOGAN TURNER (see *Journal of Laryngology*, Feb. 1920, p. 34).

Case of Latent Double Frontal Sinus Suppuration with expansion of the sinuses, following a bullet wound received three years previously—Mr W. M. MOLLISON.

Mr HOWARTH suggested that the latency (absence of nasal symptoms) was due to the fact that the fronto-nasal duct was blocked by scar tissue. A mucocele or pyocele of the frontal sinus was thereby produced, as in the present case.

December 5, 1919.

Fibroma of the Aryepiglottic Fold removed with the Aid of Suspension Laryngoscopy—Mr W. M. MOLLISON.—Male, aged 40. Large, smooth, globular swelling covered by somewhat pale mucosa. Voice thick; occasional slight suffocative attacks. Tumour dissected out after some difficulty: size of a pigeon's egg: microscopically, a hyaline necrotic fibroma.

Royal Society of Medicine

Enlarged Diseased Tonsils of Cryptic Type, destroyed by Applications of Escharotic Paste (London Paste)—Dr IRWIN MOORE.—Female, aged 22. Underwent five applications during three months. Remarkable shrinkage of tonsils without occlusion of the crypts and formation of cicatricial tissue.

Mr H. J. BANKS-DAVIS, Mr W. STUART-LOW, and Dr WALKER DOWNIE did not approve of the method as a routine procedure.

Multiple Polypi (Œdematous Fibromata) of the Middle Third of the Œsophagus—Dr WILLIAM HILL.—Male, aged 26. Dysphagia, May 1919. Stenosis due to large swelling of right wall of middle third of gullet. Microscopic examination of tissue showed normal structure of gullet and signs of inflammation. Sarcoma of mediastinum suspected on account of continuance of pain. Radium bromide emanations used without improvement. Progressive loss of weight. In September 1919, original neoplastic swelling larger and beneath it three large fleshy-looking polypi and some smaller mucous polypi visible. Masses removed showed structure of ordinary nasal polypi. The exhibitor wished advice as to further treatment.

The discussion turned largely upon the advisability of performing gastrostomy, or upon the introduction of Symond's or Hill's œsophageal feeding-tubes. Gastrostomy was approved of only when performed early in the history of the disease (Mr MUSGRAVE WOODMAN, Mr E. D. D. DAVIS). The unsatisfactory results of a late gastrostomy was emphasised by Sir ST CLAIR THOMSON, Mr LIONEL COLLEDGE, and Mr W. M. HOPE. Dr IRWIN MOORE and Mr WILLIAM HILL recommended the use of Symond's and Hill's tubes.

Impacted Foreign Bodies. Fish Bone perforating the Inferior Constrictor and leaving Fatal Posterior Mediastinal Abscess—Dr WILLIAM HILL.—Woman, aged 38, examined three weeks after impaction of the bone. Large peri-pharyngeal and posterior mediastinal abscesses, opened during endoscopic examination. Death from septicæmia and heart failure. A perforation was found in the posterior wall of the deep pharynx.

Mutton Bone impacted in Larynx requiring Removal by Crico-tracheotomy—Dr DOUGLAS GUTHRIE.—Boy, aged 10. While attempting removal under suspension, respiration became so embarrassed that tracheotomy was necessary. Two days later, the wound was enlarged upwards through the cricoid cartilage and the bone removed; no stenosis resulted.

Mr HOPE, Mr LAWSON WHALE, and Mr SOMERVILLE HASTINGS recorded cases of foreign bodies producing pharyngeal and mediastinal abscesses.

Societies' Proceedings

Supernumerary Nostril and Nasal Cavity on the Right Side—Mr H. BELL TAWSE. Female infant, one of twins, the other twin being anencephalous.

Spontaneous Cicatrisation of Well-marked Tuberculosis of Larynx, with General Treatment only—Sir ST CLAIR THOMSON.—Female, aged 42, had ulcerating infiltration in the inter-arytenoid region in April 1918. She had tuberculosis of the lung with bacilli in sputum seven years ago. The larynx completely healed with silence.

The discussion dealt with the treatment of laryngeal tubercle by silence alone or combined with galvano-puncture in suitable cases. Opinions differed as to the value of the electric cautery.

Naso-pharyngeal Angeio-fibroma—Mr G. W. DAWSON.—Boy, aged 13½. The tumour which bulged the left cheek, presented at the left nostril and projected downwards into the pharynx, was removed through the nose and mouth, after preliminary laryngotomy. Recurrence after nine months, and was treated by two insertions of radium. The applications had no beneficial effect. An external operation was performed; most of the superior maxilla had disappeared. Recovery.

Congenital Occlusion of Left Choana—Dr J. DUNDAS GRANT. A girl. The obstruction was mainly osseous, but the central portion was fibrous. The channel was restored by removing the posterior part of the septum nasi and by chiselling away the bone.

Papilloma at the Bifurcation of the Trachea (Specimen)—Dr W. JOBSON HORNE.

Intrinsic Cancer of Larynx in a Woman aged 33—Mr G. A. CARTER, Mr C. W. M. HOPE, and Sir ST CLAIR THOMSON.—The disease involved the entire right vocal cord; hoarseness had been present for four years; the cord was freely movable.

Dr JOBSON HORNE pointed out that the microscopical sections, from the manner in which they had been cut, were not conclusive of carcinoma.

Melanotic Sarcoma of the Nose—Mr W. M. MOLLISON.—Woman, aged 43. Tumour of a dark purple appearance occupied the left nasal cavity. Portion removed proved to be melanotic sarcoma. Lateral rhinotomy through Moure's incision. Recovery.

Extensive Papilloma of the Hard Palate—Mr NOURSE and Mr ARCHER RYLAND.—Male, aged 55. The tumour was attached to the buccal surface of the hard palate on the right side.

ABSTRACTS

NOSE AND ACCESSORY SINUSES.

New Intranasal Procedures for Correction of Deformities, successfully applied in over 1000 cases during the past twelve years. GUSTAV TIECK (New York). (*American Journal of Surgery*, May 1920.)

The deformities mainly dealt with are hook or bent nose, saddle nose, laterally deviated nose, and the long nose. The author has not attempted to correct deformities due to syphilis, and has regarded as a contra-indication to operation infection of the accessory sinuses, Eustachian tube or middle ear. The article is illustrated by several very striking "before" and "after" photographs, which bear witness to the cosmetic success of his methods. The essential feature of the operative technique is an adequate exposure of the nasal bones and nasal processes of the maxilla and of the nasal cartilages, together with a very wide liberation of the overlying soft parts from these skeletal structures. The approach for this process is by some three or four intranasal incisions in each nasal fossa. Occasionally, it is necessary to saw through the nasal processes of the maxillæ and to mobilise the nasal bones. The author operates under local anæsthesia and describes his incisions in detail, with short notes indicating the manner in which this method of approach is utilised in correcting the deformities. Intranasal and external splints are used to support the nose after operation.

GILBERT CHUBB.

Glioma of the Nose. ANGLADE AND PHILIP. (*La Presse Medicale*, 10th July 1920.)

The patient was an infant, three days old, and unable to suck on account of nasal obstruction. The right nostril was filled by a smooth red tumour, and the root of the nose was broadened. The growth, which appeared to spring from the upper part of the nasal cavity, and was the size of a haricot bean, was removed by snaring.

Three months later it recurred, and on this occasion the base was curetted after removal, and a series of X-ray exposures were given, with apparently good effects. The tumour was covered by mucous membrane on its free surfaces, and presented the histological appearance of a glioma.

The authors suggest that the growth may have had its origin in the olfactory bulb, and have pushed its way downwards through the cribriform plate. They have found in literature only four observations

Abstracts

on glioma of the nose, but consider that the condition would be more frequently recognised if a histological examination of nasal tumours were undertaken in all cases.

DOUGLAS GUTHRIE.

The Treatment of Staphylococcal Infections of the Nasal Vestibule and Auditory Meatus. HIRSCH & MAIER. (*Z. f. O.*, Bd. 79, 1920.)

The writers claim that a 10 per cent. watery solution of potassium permanganate is a specific for the local treatment of staphylococcal infections, particularly boils. The top of the boil is removed with forceps and the cavity cleaned out with a mop of cotton wool soaked in the solution. The surrounding skin is also swabbed with the solution and after drying is smeared with mercurial ointment. The painting is carried out several times daily at first. Potassium permanganate has no effect on distant lesions nor will it prevent recurrence, but it will materially reduce the duration of the boil. The authors show that potassium permanganate gives off five molecules of oxygen in an acid medium as compared with three in a neutral medium. As staphylococci are acid-producing bacteria they thus assist in their own destruction.

J. K. MILNE DICKIE.

Treatment of Malignant Tumours of the Antrum. G. B. NEW.
(*Journ. Amer. Med. Assoc.*, 8th May 1920, p. 1296.)

The writer claims that treatment of malignant tumours of the antrum by the cautery and radium eliminates the operative mortality and reduces the percentage of recurrences. Heat in the form of a soldering iron is used through an opening made in the palate or in the canine fossa with ether anaesthesia followed by treatment with 100 or 200 mgm. of radium either immediately after cauterisation or ten days later.

Thirty-three cases were seen at the Mayo Clinic, of which 15 were inoperable and the remaining 18 were treated by the cautery and radium. Sixteen of the 18 treated cases were stated to be primary tumours of the antrum, and squamous carcinoma of the antrum represented more than one-half of all the malignant tumours and were more than twice as frequent as sarcoma. Of the 18 patients with malignant tumours of the antrum who were treated by the cautery 3 are dead, the tumour recurred in 2, no recurrence appeared in 10 from periods of eight to twenty-eight months. Seven of these were free of growth for more than twelve months; 3 patients could not be traced.

Seven of the 18 were squamous carcinoma, of which 4 had recurrence after operation; the remaining 3 were free from the growth for more than twelve months. Two patients lost the eye on the side involved from the reaction of the cautery and radium.

As a rule the diagnosis of malignant disease of the antrum is not

Nose and Accessory Sinuses

made until the condition has become self-evident by the bulging of the cheek or palate, or by the involvement of the orbit or nose. In some cases the earliest symptom is pain frequently referred to the teeth, in others nasal discharge, and nasal obstruction is the first complaint. The paper is extensively illustrated.

E. D. D. DAVIS.

Malignant Growths of the Upper Jaw and Antrum. E. D. D. DAVIS. (*Lancet*, 1920, Vol. ii., p. 1090.)

Writes from an experience of 39 cases, the nature of which were as follows: squamous carcinoma, 19; round-celled sarcoma, 5; endothelioma, or columnar carcinoma, 7; papillomatous growth, 3; chondro-sarcoma, 2; spindle-celled sarcoma, 2; melanotic sarcoma, 1. The majority of the squamous carcinomata originated in the ethmoid and spread to the antrum *via* the orbital plate. Four of the round-celled sarcomata began in the ethmoid and were clinically identical with the last-named; one originated in the deep tissues of the cheek. The endotheliomata grew from the ethmoid. The papillomata occurred in the region of the inferior turbinal and were more benign, with recurrences at long intervals. The chondro-sarcomata were found in young subjects about sixteen years old, and were inoperable—their site of origin could not be ascertained. The spindle-celled sarcomata arose in the antro-nasal wall or palatal process, the melanotic sarcoma in the nasal vestibule. In no case could origin in the mucoperiosteal lining of the antrum be demonstrated.

Symptoms and operations are discussed. The development of these growths is insidious, and most commonly the first symptom is pain in the cheek, radiation to the forehead or temporal region. This, with severe epistaxis, is highly suspicious.

Operations by the author followed two principles:—

- (1) A thorough exposure of the growth to ascertain its limits as far as possible.
- (2) Complete excision of the growth together with a free margin of healthy tissue. The orthodox excision of the upper jaw was discarded. Mr Davis describes his method in detail.

MACLEOD YEARSLEY.

Optic Neuritis, associated with Disease of the Nasal Sinuses. Report of Two Cases. E. C. ELLETT, M.D. (*Journal of the American Medical Association*, September 1920.)

Ocular disease appears to arise from nasal disease in one of two ways; either by absorption of toxins from a focus of suppuration, or by contact between the pathological process in the nose and some ocular structure.

Abstracts

The author presents in detail the reports of two cases of optic neuritis associated with disease of the nasal sinuses.

The close relation which exists between the optic nerve and the sphenoid sinus is well known. In a study of 100 skulls Francis and Gibson were struck with the thinness of the partition between the two, and noted that one-third of optic nerves are shielded from the sphenoid sinus by a thin paper-like bony wall, measuring a quarter of a millimeter or less in thickness. It is known that specimens are seen in which an actual dehiscence exists, and in such cases the likelihood of a sphenoidal or posterior ethmoidal suppuration affecting the nerve is very great. The nerve under these circumstances may show a retro-bulbar neuritis, manifested only by a disturbance of vision and a central scotoma, or less often, an optic neuritis with visible changes in the fundus.

The ocular lesion in disturbance from posterior ethmoidal and sphenoidal disease is practically always of the optic nerve. But this is certainly not often the case in affections of the anterior sinuses.

Looked at from the rhinologist's point of view these cases are rare. The author, judging from an extensive experience, thinks the number of affections of the eye in a given number of cases of nose and sinus disease of any character is very small.

Striking features of the condition under consideration are the sudden onset of the visual disturbance and its equally sudden improvement when the nasal condition is relieved. The care necessary to arrive at a diagnosis of disease of the posterior nasal sinuses is well known, but is a matter which mainly concerns the rhinologist. Nevertheless, we should bear this difficulty in mind, and request repeated examinations if necessary.

The development of a good technic for the radiographic investigation of these sinuses has put the question of their diagnosis on a much more satisfactory basis.

ARCHER RYLAND.

Optic Nerve Disturbances in Diseases of the Posterior Nasal Sinuses.

JAMES BORDLEY, M.D. (*Journal of the American Medical Association*, September 1920.)

It has been the author's fortune to see a fair number of optic nerve lesions produced by quite evident sinus disease, and it has also fallen to his lot to meet more than a few which could be determined only by close and repeated observations.

There is a too frequent diagnosis of intranasal disease by those who judge the probability of ocular complication by the extent of disease found. There are others who apparently conclude that without visible evidence in the nose it is fair to assume that no sinus

Nose and Accessory Sinuses

disease exists. Often neither of these assumptions is correct, and they may lead to very serious consequences.

Assuming that all probable causes have been eliminated, and that every means of diagnosis has been resorted to, the author suggests that when we are face to face with a serious optic nerve disturbance, the part of conservatism and good judgment requires an operative exploration of the ethmoidal and sphenoidal cells.

He feels confident that visual disturbances are frequently the first suggestions of serious sinus disease which may eventually lead to blindness or death.

It is only right to heed the warning and eradicate the disease before it has impaired function or destroyed life.

Details of five cases are reported.

ARCHER RYLAND.

The Diagnosis of Accessory Sinus Disease causing Loss of Vision.

LEON E. WHITE. (*The Boston Medical and Surgical Journal*, 22nd July 1920.)

Three types of optic neuritis are due to accessory sinus disease.

1st. Those due to direct spreading of the inflammation to the sheath of the optic nerve from the foci of infection.

2nd. Those due to toxæmia from infection in the sinuses.

3rd. Those due to hyperplasia.

The presence of pus or polypi may determine the type, but diagnosis is often most difficult, especially in the hyperplastic type, when the conditions often vary only slightly from the normal. The author is of opinion that operation should be advised in all cases of optic neuritis in which pus is demonstrated by rhinoscopic examination or polypi are present, and also when there is marked blocking of the sinuses by a deflection of the septum or by hypertrophic turbinates. In many other cases relief has been found to follow the opening of the sinuses, although the examination of the nostrils gave no indication of sinus disease. Medical, dental, neurological, Wassermann and X-ray examinations should always be made, but in acute cases the danger of delay is very great. When toxæmia is suspected, its site of origin, which may be teeth, tonsils, accessory sinuses, intestinal auto-intoxication, alcohol, tobacco, or syphilis, should be investigated. The possibility of pituitary disease should also be considered. The author is of opinion that these investigations should not occupy more than forty-eight hours.

Details of 22 cases are given. Of these, all but three were operated upon. Of the latter, one with infected sphenoidal sinus refused operation, the affected eye subsequently becoming quite blind. The second recovered after hot irrigations of the nostrils.

Abstracts

In this case tobacco poisoning was suspected. There was a case of sarcoma of the sphenoid. The post-operative results of the remaining cases are clearly given in 17. There was complete recovery or great improvement in 11, and in all there was some improvement. In 7 cases the nasal examination was negative, but in several of these some evidence of sinus disease was found at the operation, and there was invariably improvement afterwards. The X-ray findings were positive in 6 cases, but the author emphasises the view that a negative X-ray finding by no means contra-indicates an operation. The middle turbinal was removed in all cases, and the sphenoidal sinus opened in all but one. The posterior ethmoidal cells were opened as a matter of routine, but the other accessory sinuses were not interfered with unless suspected of infection.

In many specimens from the hyperplastic cases, changes were so slight that it was practically impossible to detect them. The author would not hesitate to operate on a perfectly normal-looking nose, if the symptoms were those of pressure on the nerve, after having reasonably excluded other possible causative factors. It would seem the wiser course to err on the side of advising operations than to permit a patient to become permanently blind through delay.

J. A. KNOWLES RENSHAW.

Ethmoidal Operations for Pansinusitis. REAVES.
(*The Laryngoscope*, 1920, Vol. xxx., p. 289.)

Reaves states that the amount of cocain can be reduced by following it with 3 c.c. of 1 per cent. novocain and 2 mm. of adrenalin injected under the periosteum of the middle turbinate about the area of Meckel's ganglion and the septum just opposite the sphenoidal opening. The desire to leave the operative field covered with mucoperiosteum has robbed Reaves of his speed in ethmoidectomies. Preliminary submucous resection of the septum may be necessary. Reaves uses his special ethmoidal knives which fit one handle.

Ethmoidal Cells.—The first step is removal of the middle turbinate, the vertical plate of the ethmoid with the superior turbinate and lower half or two-thirds of the ethmoidal cells. In most cases, after this, the operator can see the roof of the ethmoid, his coveted "landmark." If not, he must gently bite off the most pendulous cells. The operator follows up the removal of the ethmoid cells forward and backward or *vice versa*, with forceps adapted to engage the cells which are even higher than the nasal roof. Reaves advises the use of forceps that are small enough not to crowd and sharp enough to cut cleanly. We should always remove the cell proper and not its accessory wall of attachment at the roof.

Pharynx and Nasopharynx

Frontal Sinus.—After the ethmoid cells around the infundibulum of the frontal sinus have been removed, a curved probe can be passed into the frontal sinus. This opening is usually sufficient to effect a cure. The pernicious habit of curetting the frontal duct should be discouraged.

Maxillary Antrum.—If the space is sufficient between the inferior turbinate and orbital wall, it can be opened in the middle fossa. The inferior turbinate should never be sacrificed where an ethmoidectomy has been done. If the space is not sufficient, the turbinate can be pushed up and the punch passed under the turbinate.

Sphenoidal sinus is apparently opened in the usual way with punch forceps.

J. S. FRASER.

Exophthalmos and Third Nerve Palsy due to Posterior Ethmoiditis.

VAIL. (*The Laryngoscope*, 1920, Vol. xxx., p. 355.)

Vail records the case of a male, aged 50, who complained of burning pain around the right eye and deep in the orbit. Within twenty-four hours his right upper eyelid fell down and the eye turned outward. On examination there was some exophthalmos, complete ptosis, divergence and mydriasis of the pupil. Ophthalmoscopic examination negative. X-ray examination showed complete clouding of right frontal, ethmoidal, and antral regions. Lamb used suction treatment for three weeks and later performed exenteration of the right ethmoid labyrinth, which was full of pus. Vail thinks that there was probably a subperiosteal abscess of the orbit which had broken through the orbital wall. This, fortunately, did not rupture through the periosteum to produce orbital abscess.

J. S. FRASER.

PHARYNX AND NASOPHARYNX.

Primary Actinomycosis of the Tonsil. Dr VERNIEUWE (Ghent).

(*Bulletin d'Otorhinolaryngologie*, Paris, Nov. 1920, p. 283.)

The author records a case of actinomycosis in a patient under treatment for pulmonary tuberculosis. Both apices were dull, also the right base, and there was some chronic pleurisy in this situation. Fistulæ remained in the eighth right intercostal space behind and over the sternum from evacuation of "cold abscesses." Examination of curettings from these fistulæ showed golden granules of actinomycosis, and this was confirmed on pathological examination. It now became clear that the base of the right lung was the earliest focus in the chest, and radiograms showed that the disease had

Abstracts

extensively involved both lungs and the mediastinum. In this the disease appears to have pursued a typical course.

Less than a month before the onset of cough, the patient had had a tonsillar abscess. This was incised, and for five months discharged non-fœtid pus. At no time were the glands of the neck involved, nor could anything resembling Cheatle's "track" be made out. The path of infection seems to have been through the œsophageal wall into the mediastinum and right lung.

Treatment with Pot. Iod. gr. lx. to gr. lxxv. was commenced. At the end of a week this had to be stopped on account of hæmoptysis and dyspepsia with fever; a second attempt was abandoned in four days. Colloidal iodine was then given (local and intramuscular). Great improvement of all the lesions took place under this treatment.

The author gives statistics on the frequency of tonsillar actinomycosis. One author records it in 14 per cent. of tonsillectomies, but Vernieuwer regards this percentage as much too high (!). The patient in his case was a professional man who had nothing to do with fodder, etc., and no cause of infection could be suggested.

A bibliography of 68 references to actinomycosis in throat, nose, and ear work accompanies the paper.

E. WATSON WILLIAMS.

The Renal Complications of Acute Lacunar Tonsillitis.

H. L. CRONK. (*Practitioner*, Nov. 1920.)

The close relationship of tonsillitis to nephritis has escaped the notice of most authorities. As a rule, when albuminuria accompanies tonsillitis, it is regarded as merely the result of high temperature. Some recent writers, however, regard the throat as an important avenue of infection in kidney disease.

The author examined the urine daily in a number of tonsillitis cases, eliminating all cases of suspected diphtheria or scarlet fevers: albumin was present in 80 per cent. The albuminuria did not depend upon the height of the temperature. In 7 per cent. of the cases, nephritis was present, as indicated by casts in the urinary deposit. This nephritis was of a latent type, with few signs, and resembled scarlatinal nephritis in its tendency to recovery.

A good bibliography accompanies the paper.

DOUGLAS GUTHRIE.

REVIEWS OF BOOKS

Ohrenheilkunde. Für den Praktischen Arzt. von Priv. Doz.
Dr RUDOLF LEIDLER. Urban & Schwarzenberg, Berlin, 1920.

This paper-bound book of 278 pages is written for students and practitioners as an introduction to the study of diseases of the ear.

In the section relating to the examination of the ears, the principles underlying the tuning-fork tests, and the manner of applying them, are clearly expressed. With regard to investigation of labyrinthine function, an improvised "turning" test, done without the aid of a specially constructed rotating chair, is perhaps of doubtful value; but the description given may stimulate interest in labyrinthine disorders.

The comparatively poor prognosis of many forms of aural disease sometimes tempts the busy practitioner to reduce his conception of deafness to but two varieties, one which is due to impacted cerumen, and the other which is not. Perusal of this book should at least inculcate a more optimistic attitude towards forms of deafness falling within the latter category. Moreover, in otology there are diverse clinical observations which always bear repetition, for example, the note on the false impression sometimes conveyed by epithelial debris in the ears of infants, and that on the importance of examining the ears in every case of head injury.

Discussing the medicaments in common use, the author condemns indiscriminate ordering of hydrogen peroxide drops, on account of dangers which he enumerates. Whilst its subsidiary deodorant and hæmostatic properties have their value, as in the treatment of aural polypi, the main action of hydrogen peroxide is mechanical. He recommends, therefore, that it be reserved almost exclusively for cases in which there is a large perforation with lodgement of inspissated pus in the crevices of the tympanic cavity.

Removal of foreign bodies from the ears and the treatment of surgical emergencies connected with otitis with which the practitioner is likely to be confronted, are described in detail.

Paracentesis of the tympanic membrane is said to be indicated in every case of acute otitis associated with signs of cerebral irritation: in children—drowsiness, neck rigidity, refusal of food; in adults—severe headaches, sensation of giddiness, and vomiting. Pain in the mastoid process and high fever (102° or over) also constitute absolute indications. In the absence of these symptoms, when the drum shows slight redness and swelling without bulging, the operation may be deferred. But if, in spite of the subsidence of inflammatory swelling

Reviews of Books

to such an extent that the malleus becomes visible, severe deafness, tinnitus, and possibly vertigo persist, paracentesis should nevertheless be performed. In bilateral inflammations of equal severity, paracentesis is performed on each side.

In the chapter on intracranial complications of middle ear disease the description of the symptoms of brain abscess is somewhat meagre, in view of the importance of early recognition of this affection, and the danger incurred should the medical attendant allow himself to be misled by the absence of fever. Possibly the diminishing frequency of brain abscess justifies this brevity.

A too highly epitomised description is often less valuable than one less exhaustive which emphasises essential points.

In the main, Privat-Doctent Dr Rudolf Leidler's book strikes an agreeable mean between the two possible extremes.

OLIVER LODGE.

Local and Regional Anæsthesia in Oto-Rhino-Laryngology. By G. CANUYT and J. ROZIER, with Preface by Prof. MOURE. G. Doin, Paris. 1920. Pp. 188. 117 Illustrations.

In this country and in America the majority of surgical operations are performed under general anæsthesia, but on the Continent, and especially in France, the technique of local and regional anæsthesia has been widely studied and adopted since the appearance of the pioneer work of Reclus and others. By regional anæsthesia is meant the injection of an anæsthetic solution into the nerve or nerves which supply the field of operation. Canuyt and Rozier describe in detail the methods of securing anæsthesia in the ear, nose, and throat, and also the application of local anæsthesia to the plastic surgery of the face, the surgery of the tongue and jaws, and the surgery of the thyroid gland. A preliminary chapter is devoted to a description of the syringes and needles employed, and to a consideration of various drugs and solutions.

Cocaine, novocaine, and the French preparation allocaine are recommended, with the addition of adrenalin in each case. No other drugs are mentioned.

The induction of anæsthesia in the various regions is then systematically discussed, the work being illustrated by a series of good photographs and diagrams showing clearly the nerve supplies of all parts of the ear, nose, and throat.

This little book appears to meet a distinct want, and we heartily recommend it to all who practise oto-laryngology.

DOUGLAS GUTHRIE.

OBITUARY

SIR FELIX SEMON, K.C.V.O., F.R.C.P.

WITH the passing of Felix Semon, Laryngology has lost a man of light and leading. It will probably be considered no injustice to anyone, living or dead, if we venture the statement that he did more for the advancement of our specialty than any other. It is not intended to imply that he had no rivals in certain departments. Thus there are and have been as great clinicians, but, all in all, he possessed qualities which made him an outstanding personality.

His early history is well known to all of us. Of foreign birth and nationality, he came to this country many years ago and remained a loyal subject of the Empire ever afterwards—a loyalty which was much resented by the compatriots of his earlier days.

The scientific work with which his name is most widely associated concerns two very important conditions—laryngeal paralysis and malignant disease. Those who are old enough to have followed the question of recurrent paralysis from the beginning of his investigations will remember how literally may be taken the statement that he produced order where previously chaos had reigned. It used to be a veritable trial to the spirit to read of the causes of immobile vocal cords, even as presented by the best authors, because it never appeared clearly why these things were so. Then came Semon, not with a working hypothesis only, but with careful objective demonstration, and light relieved our darkness. In order definitely to establish his position, much further labour was required, including animal experiments which he conducted in co-operation with the late Sir Victor Horsley, and a great deal of, in some cases, rather captious criticism had to be encountered and disproved. Eventually, however, what we now know as “Semon’s law” stood upon an absolutely sound foundation.

His other great achievement was with regard to malignant disease of the larynx, and the revival of the operation of thyrotomy for early cases. The latter was, we believe, actually due to the late Sir Henry Butlin, but possibly owing to the exigencies of other interests, he did not take so prominent a part in letting its advantages be known. When Semon set his mind to studying laryngeal carcinoma, he again accomplished an epoch-making work in revolutionising text-book descriptions of the malady. Moreover, he enabled the fell disease to be recognised on its earliest incidence and at a time when immediate thyrotomy was still capable of effecting a cure. His

Obituary

published cases and results have shown how successful he was in this respect.

In addition to his work on innervation and cancer, Semon published many observations on other subjects. Thus to him we owe a description of the throat symptoms liable to occur during the menopause, of mechanical interferences with the movements of the crico-arytenoid articulation, the value of rest of the voice in phthisis laryngea, and the clinical features of pneumococcal throat affections. It should also be mentioned that in 1883 he had noted and called attention to the similarity of symptoms between Myxœdema as described by Ord, and "Cachexia Strumipriva"—an observation upon which the successful treatment of the former, as now practised, largely depends. The same acumen was also shown in the paper which he wrote with a view of showing the clinical identity of the various forms of phlegmonous inflammation affecting the throat and neck.

In addition to purely scientific work, Semon devoted much time and energy to consolidating the position of the young specialty which he had espoused. That Laryngology was important, those within it always knew. The difficulty, at least in this country and to some extent elsewhere, was to obtain general acceptance of this fact. By founding the "Laryngological Society of London" as well as *The International Centralblatt für Laryngologie*, which he edited for many years, and by insisting upon the proper recognition of the specialty at all times, he was able to bring pressure to bear which has resulted in the status we now enjoy. Perhaps it may occur to the reader that if not he, then another would have arisen to do it. It may be so, but Semon had very remarkable gifts quite apart from his scientific attainments, and it was the good fortune of Laryngology to have such a man fighting its battles.

Semon was of the type of men of whom it may be said that they would have excelled in whatever path of life they had chosen. He was enthusiastic and at the same time logical, fiery but also just, according to his lights: in a way he was sentimental, but he refused to let sentiment govern his actions; finally, he was not only a man of wide general knowledge, but he had equally wide general interests. Thus he combined within himself qualities which we rarely find united in one individual, and it resulted that he was peculiarly well fitted to take a leading place.

To all who knew him well, his lovable nature was apparent. His success came suddenly and rapidly, but he was never spoiled by it in any way. Indeed, one of his many charms was that in spite of the brilliant career he had made for himself in the world, he had retained much of that beautiful simplicity which we more often

Obituary

encounter in the young than in those who have forced their way to prominence. His sense of humour was always strong, and many will remember what a wonderful gift he had as a raconteur. His tact, too, was very perfect, so that neither by anecdote nor in any other way did he offend. Yet if he heard anything said which he knew to be inaccurate, and which he thought ought to be controverted, he never hesitated to contradict. Somehow—and we must ascribe it chiefly to tact—he was generally able to assert himself when necessary without hurting the feelings of others.

He was a man of extraordinary energy and never spared himself, so that when he undertook a task he invariably pursued the matter in hand with tireless zeal. For years he held hospital appointments, at first as Physician to the London Throat Hospital, and later as Physician to the Throat Department of St Thomas' Hospital. Then, as his practice increased, he gave up first one and then the other.

Most men would have found their lives very fully filled by doing less than he had done. Not so with Semon, for he made time for many other accomplishments and occupations. Thus he was an excellent and enthusiastic musician, and his many friends will remember what pleasure they derived from musical evenings at his hospitable home and how they were privileged to hear Lady Semon—once beloved by London audiences as Miss Redeker—sing while her husband accompanied her. Semon was also an all-round sportsman of no mean order. A keen shot, an ardent salmon fisher, a fearless and accomplished rider, he used to enjoy to the full such leisure as he permitted himself. If he worked hard, he played hard and spared himself in neither case. Just as he was able to take part in almost any form of out-door recreation, he could hold his own in in-door pastimes and excelled in most card games.

He was thus a man of many interests, and partly no doubt on this account, mixed with people of all kinds, many of whom became his personal friends. Thus he wielded an influence beyond that which he could have attained on purely professional lines.

When he retired from practice in 1910, his many friends collected funds to establish a Lectureship in his name at London University, and at the same time entertained him and Lady Semon at dinner. The gathering was a most striking one, and well illustrated the catholicity of his friendships. Prominent politicians, great lawyers, men and women of different lands well known in the worlds of music, art and literature, united with his own profession to do him honour. Soon after this he and his wife spent a happy year in touring round the world—meeting many old friends in foreign lands. After coming home they went to live at their beautiful home—Rignalls, near Great Missenden—where on Tuesday, 1st March 1921, Semon breathed

Obituary

his last. To many who were permitted to enjoy the Semons' hospitality, happy memories will occur, not only of lovely and artistic surroundings, but of a charming abode in which it was quite evident that domestic happiness reigned supreme.

Semon was the recipient of many honours. Knighted in 1897, he was made C.V.O. in 1903, and K.C.V.O. in 1905. He was Physician Extraordinary to the late King; Knight of the Order of the Prussian Crown, 2nd class, and Red Eagle, 3rd class; Commander of the Order of Isabella la Catolica; Grand Officer Order of Medgidie and Grand Cordon of Star of Zanzibar. In addition he was an honorary and corresponding member of a large number of laryngological and medical societies throughout the world.

We have endeavoured, shortly, to do justice to the life of a great laryngologist, who was also one of the most lovable of men. Those of us who were his friends grieve for him deeply; but if our grief is hard to bear what must be the feelings of Lady Semon and her sons. A deeply loved and loving husband and a devoted father has gone from them, and no words of heartfelt sympathy we can utter will avail to make their burden less heavy. They will at least have the consolation of realising that many share their sorrow, and of remembering the splendid career of him who has passed over.

P. M'BRIDE.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W.

Section of Laryngology (President, Dr W. Jobson Horne).—The Annual Meeting of the Section will be held on Friday, 6th May, at 4 P.M. Members intending to show cases or specimens should send in their notes a fortnight before that date to the Hon. Secretaries, C. W. M. Hope, 22 Queen Anne Street, W. 1, or W. G. Howarth, 75 Harley Street, London, W. 1.

The Summer Meeting of the Section will be held on 2nd, 3rd, and 4th June. Members of the Section are invited to contribute papers of Rhino-Laryngological interest; papers on original or research work are especially wanted. The titles of papers should be sent to Mr Charles W. M. Hope, 22 Queen Anne Street, London, W. 1, not later than 31st March, for the approval of and acceptance by the Council of the Section. A short synopsis of the papers accepted should be sent in for publication by 2nd May.

2nd June.—Papers will be read and discussed from 2.30 to 4 P.M. and from 4.30 to 6 P.M. *3rd June*.—Papers will be read from 10.30 A.M. to 1 P.M. Demonstrations will be conducted between 2.30 and 4 P.M.

The Ordinary Meeting of the Section will follow at 4 P.M.

4th June.—Papers will be read from 10.30 to 12 noon.

There will be a Museum in connection with the Summer Meeting.

A Dinner will be held at the Trocadero Restaurant on *Friday evening, 3rd June* (hour 7.30 for 8 o'clock).

Section of Otology (President, Sir Charles Ballance).—The next Meeting of the Section will be held at Leicester on 16th April at 2.30 P.M. Members intending to show patients and specimens should send notes of the same to the Senior Hon. Secretary, Mr Lionel Colledge, 22 Queen Anne Street, W. 1, at least twelve days before the Meeting. Papers must be sent in at least twenty-one days in advance, complete and ready for printing, in order that they may be previously examined and approved by the Council. Trains leave St Pancras at 10.15 and 11.45 A.M.; dinner 6.30 P.M.; train leaves Leicester for London at 8.5 P.M.

Société Française d'Oto-Rhino-Laryngologie.—The Annual Meeting will be held in Paris from the 9th to the 12th May at the Hôtel des Sociétés Savante, 8 Rue Danton, under the Presidency of Professor

General Notes

Mouret of Montpellier. The subject for general discussion will be: "Complications orbito-oculaires des Sinusites," to be introduced by Dr Lemaitre. The General Secretary is Dr Robert Foy, 28 Rue La Trémoille VIII^e, to whom all communications should be addressed.

The Annual Meeting of the American Medical Association will be held in Boston, Mass., from 6th to 10th June. Dr William B. Chamberlin, 1020 Huron Road, Cleveland, Ohio, the Secretary of the Section of Laryngology and Otology, will be pleased to give any information regarding the meeting to laryngologists and otologists in this country who may be arranging to visit the United States early in June.

The American Laryngological Association will hold its Annual Meeting in Atlantic City on 30th May.

The American Laryngological, Rhinological, and Otological Society will hold its Annual Meeting in Atlantic City on 1st and 2nd June.

A combined Meeting of members of the American Otological Society and members of the Section of Otology of the Royal Society of Medicine will take place in London on 14th, 15th, and 16th July. Further details will be published later.

The British Medical Association will hold its Annual Meeting at Newcastle-on-Tyne on 19th, 20th, and 21st July.

There will be an International Conference on Tuberculosis in London on 26th, 27th, and 28th July, under the Chairmanship of Sir Robert Philip, Professor of Tuberculosis in the University of Edinburgh.

Mr Charles J. Heath, F.R.C.S., has been elected a Companion of the Institute of Marine Engineers.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

REPORT UPON 188 CONSECUTIVE CASES OF ACUTE OTITIS MEDIA AND MASTOIDITIS IN WHICH THE SCHWARTZE OPERATION WAS PERFORMED.*

By GLADYS A. A. BOYD, M.B., Ch.B., late Clinical Assistant, Ear and Throat Department, Royal Infirmary, Edinburgh.

THE following report is a continuation of that published by Dr John Hewat in the *Journal of Laryngology*, 1914 (Vol. XXIX., page 261). The cases analysed in the present report were operated upon by Dr Logan Turner and Dr J. S. Fraser during the years 1914-19 inclusive. In this period 191 cases were diagnosed as mastoid or intracranial complications of acute otitis media. Of these, however, 3 were found at operation to be cases of furunculosis, and have not been included. The analysis, therefore, concerns 188 cases.

Age.—The age varied from 9 weeks to 76 years, the average age being 21 years. Ages in decades—First, 61; second, 51; third, 20; fourth, 19; fifth, 21; sixth, 13; seventh, 1; eighth, 3. Of those in the first decade, 5 were under one year.

Sex.—Of the 188 patients, 93 were males and 95 females.

Side.—The right ear was affected in 96 cases and the left ear in 91. In 1 case both ears were affected and required operative treatment.

Cause.—This was ascertained in only 94 cases—Influenza, 27; coryza, 22; scarlet fever, 13; measles, 10; pharyngitis and

* Reports for the years 1919 and 1920 from the Ear and Throat Department of the Royal Infirmary, Edinburgh, under the care of A. Logan Turner, M.D., F.R.C.S.E.

Gladys A. A. Boyd

tonsillitis, 7; injury, 6; bathing, 2; erysipelas, 1. Six of the cases arose after operations on the nose or pharynx, as follows—1 after removal of tonsils and adenoids in a case with a history of previous otitis media; 1 after operation on the ethmoidal region; 1 after removal of choanal polypus through the nose; 1 after turbinotomy; 2 cases followed submucous resection of the septum.

Duration of Otitis Media before Operation.—This varied from three days to six months, the average duration of the illness being four weeks. In 35 cases there was no history of discharge from the ear; in 18 cases discharge had been present but had ceased before admission; in 135 cases discharge was present on admission. In 27 cases there was a history of previous ear trouble.

The Condition of the Ear not operated upon was noted in 71 cases. In 12 cases discharge was present; in 4 the tympanic membrane was red and bulging; in 12 an acute catarrhal condition was present; in 34 there was indrawing and opacity; 7 cases showed scarring of the membrane; in 2 cases a dry perforation was present.

Hearing before Operation.—This varied, the average being conversation voice at 2 to 3 feet.

Indications for Operation.—In many of the cases more than one indication was present. Mastoid swelling (œdema or subperiosteal abscess), 111 cases; mastoid tenderness with sagging of the meatal wall or bulging membrane, 75; profuse discharge and facial paralysis, 1; profuse discharge and swelling of glands round auricle, 1; symptoms suggesting an intracranial complication were present in 17 cases. Conservative treatment, including paracentesis, had been tried and had failed in 17 cases.

Pulse Rate before Operation.—There was an increase above the normal of 15 to 30 beats per minute in 54 cases, and an increase of 30 or more beats per minute in 56 cases.

Temperature before Operation.—(1) 98.4° F. or below—108 cases, including 29 with subperiosteal abscess, 2 with perisinus abscess and granulations on sinus, 1 with cellulitis of the neck. (2) 98.4° to 99°—21 cases, including 1 with subperiosteal abscess, 3 with abscess under the sterno-mastoid, 2 with perisinus abscess, 1 with granulations on the dura mater. (3) 99° to 100°—23 cases, including 5 with subperiosteal abscess, 1 abscess in neck, 2 granulations on sinus, 2 perisinus abscess,

Schwartz Operation in Otitis Media

1 erysipelas, 1 influenza, 2 sore throat. (4) 100° and over—37 cases, including 4 with subperiosteal abscess, 2 with coryza, 1 with labyrinthitis, and 20 intracranial complications, viz. 8 infection of sinus (5 of which were thrombosed), and 3 blood infection with no macroscopic change in sinus, 4 perisinus abscess, 4 meningitis, 1 granulations on dura mater of middle fossa. In only 10 cases the ear condition alone could be found to account for the temperature; 5 of these were under 10 years of age.

Findings at Operation.—Subperiosteal abscess in 44 cases; erosion and destruction of the cortex, 38 cases; perisinus abscess, 10 cases; granulations on sinus, 13 cases; thickened sinus wall, 6 cases; clot in sinus, 5 cases; disease spreading down to tip and necessitating removal of whole or part of tip, 85 cases; abscess in neck, 4 cases; cellulitis, 1 case; disease spreading into cells at root of zygoma and necessitating their removal, 4 cases; dura of middle fossa unhealthy, 6 cases (in 4 cases granulations were present, in 1 case lymph; extra-dural abscess in middle fossa, 1 case); granulations on dura of posterior fossa, 1 case.

Bacteriology.—In 78 cases a bacteriological examination was made. Pure culture in 55 cases—streptococcus pyogenes, 22; diplo-streptococcus, 15; pneumococcus, 6; streptococcus mucosus capsulatus, 1; staphylococcus aureus, 4; staphylococcus albus, 3; B. tuberculosis, 1; B. coli, 1; B. proteus, 1; diphtheroid bacillus, 1; mixed cultures were obtained in 23 cases.

Results of Operation.—Of the 188 cases operated upon, 164 were discharged cured. Of these, 66 were dismissed in one month or less from the date of operation. The average time required for closure of the posterior wound was forty-two days; in 2 cases healing was complete in fourteen days, but on the other hand in 1 case healing took five months. It is only fair to state that a number of the cases, in which the duration of healing was prolonged, were in hospital for only three weeks, after which they lived at home and attended the Out-Patient Department for treatment. Under these conditions healing is, as a rule, less satisfactory than in the case of in-patients.

In 9 cases scarlet fever developed within ten days of the operation, necessitating the removal of the patient to the Fever Hospital, and in 4 of these no further history was obtained.

Gladys A. A. Boyd

In 12 cases a cure was not effected by the Schwartz operation, the results being as follows—(1) In 8 cases the radical operation had to be performed later (in 2 of these the mastoiditis was tuberculous in character); in 3 the history was indefinite and the appearances at the operation suggestive of a chronic condition, but it was decided to do only the simple mastoid operation in the first instance; in 1 case scarlet fever developed after the first operation and the case became chronic in character; in 2 cases the otitis was definitely acute. (2) In 4 cases the discharge continued, but the complete operation had not been performed at the time of writing this report.

Out of 180 cases (188 minus 8 fatalities—see later), therefore, there were only 6 (3.2 per cent.) definitely acute uncomplicated cases in which the Schwartz operation failed to effect a cure.

Intracranial Complications were present in 20 cases. One case (recovery after extradural perisinus abscess) has been reported in full by Dr J. S. Fraser in the *Edinburgh Medical Journal*, January 1915. The details of the 11 other cases which recovered are as follows:—

A. Six cases of extradural perisinus abscess. In 2, the temperature was 100° or over, in one 99°, in the remaining 3 being normal or subnormal. In 5 cases the pulse was 100-120 beats per minute, in 1 case 56 per minute. In the latter case the pulse remained slow for three days after operation, but no signs of cerebellar abscess appeared. No rigors occurred in any. In every case pus was found on removing the bony covering of the sinus wall. In one case with temperature over 100°, no pus was found elsewhere in the mastoid. Five made a good recovery within five weeks. Four of these reported, and in two the ear was dry and the hearing perfect. In one nerve deafness was found; in another the hearing was bad and there was much scarring and retraction of the drumhead. In the remaining case discharge is still present and the radical operation has been advised.

B. Two cases of sinus thrombosis. (1) J. B., aged 13, admitted 14/12/18 with a history of pain in left ear for twelve days, following influenza. No discharge. Swelling and tenderness over mastoid seven days before admission; vomiting two days, and frontal headache and shivering one day before admission. *Examination*—Boggy swelling over mastoid; membrane showing

Schwartze Operation in Otitis Media

loss of gloss and redness along malleus. Tongue dry, brown, furred; sordes on teeth; foul breath; whisper heard at 1 foot. *Operation* (immediate) (J. S. F.)—Subperiosteal abscess; pus in antrum and tip cells; dura of middle fossa healthy; incision extended backwards; sinus exposed, bluish at region of upper knee, lower down thickened with granulations on wall. Sinus not opened. No stitches. (Gram+streptococci and Gram negative bacilli in pus. At this time no organisms in the blood. 15/12/18—Temperature 103, pulse 120; patient looks dull, but answers quickly; knee-jerks absent; reflexes normal; Kernig doubtful; lumbar puncture, fluid shows no increase of tension; a few Gram negative bacilli present. 16/12/18—Sleepless night; no rigors; foul breath; temperature 103, pulse 140. *Second Operation*—Internal jugular ligatured and divided; sinus opened and showed clotting above and purulent degeneration below; free bleeding from upper end only. 17/12/18—Temperature 98.1, pulse 96; blood in urine. 18/12/18—Temperature swinging from subnormal to 103. Slept well; taking food; bleeding from both ends of sinus. 19/12/18—Temperature 104 last night; pus and blood from jugular bulb; internal jugular washed freely through. 23/12/18—Failed to wash through; rigor yesterday at 6 P.M.; temperature 104.5; no bleeding either end of sinus. 26/12/18—Rigors during last three days. *Third Operation*, 12.30 P.M.—Bone removed from tip and posterior part of mastoid; posterior canal opened and jugular bulb exposed; pus found; failed to wash through; patient feeble, tongue dry, brown and furred; (blood culture—Gram+diplococci; Gram negative bacilli; clot from sinus—Gram+diplo-streptococcus); 6.20 P.M., rigor. 28/12/18—Rigor yesterday afternoon; hæmaturia present again; temperature 105, pulse 132; no pus but bleeding from bulb; nausea and nystagmus to right; escape of cerebrospinal fluid from wound. 29/12/18—Pus from bulb; 6.35 P.M., rigor; temperature 105, pulse 132. 30/12/18—Good night; no pus or bleeding from bulb; 4 P.M., rigor, temperature 103, pulse 112. 1/1/19—Quinine and urotropin given; no rigor. 7/1/19—Temperature has been coming down; cerebrospinal fluid oozing has been getting less and is now stopped. 9/1/19—Temperature up again; wound dirty; poor night; vomiting. 10/1/19—Worse; temperature 103; severe pain in knee; urine dark. 27/1/19—Now no pain, temperature normal; patient getting up. 2/2/19—Knee again painful; swelling and tenderness; X-rays show abscess in lower

Gladys A. A. Boyd

end of femur. 7/2/19—Abscess opened by general surgeon. (Gram + streptococci). 13/3/19—Still occasional rises of temperature to 101; no rigors; wound behind ear closed. Transferred for treatment of femur. 22/6/19—Patient reports; has been well and at work since operation; no trouble with ear or leg; left external meatus very narrow; ear dry; hears raised whisper at 15 feet. Note that the posterior canal was injured at the jugular bulb operation.

(2) M. S., aged 6, admitted 20/10/17, with history of pain in left ear off and on for a year. Discharge for six days; headache and swelling four days. *Examination*—Rigor in waiting-room. Temperature 104, pulse 138; tongue furred; very cyanosed; large red boggy swelling over mastoid; profuse discharge; no nystagmus. Lumbar puncture—fluid clear; no tension. (Gram + diplococcus, Gram - bacillus.) Blood negative. 12.30 P.M.—*Operation* (J. S. F.)—Subperiosteal abscess; pus in antrum (same organisms); granulations on sinus; mural thrombus; free bleeding on opening sinus, not so free at lower end; jugular vein ligatured and divided; iodoform worsted; no stitches. 21/10/17—Temperature normal, pulse 86. 24/10/17—Temperature 102 last night, pulse 104; dressed; free bleeding; still mural clot. 26/10/17—Packing removed from bulb; some bleeding; clot removed from sinus; free bleeding from bulb. Temperature still up. 28/10/17—Dressed; free bleeding from torcular end, but no bleeding from bulb. 9/11/17—Meatus dry; wound granulating. 1/12/17—Healing well; tonsils and adenoids removed. 7/2/18—Practically healed; ear dry; discharged. 3/7/20—Reports. Dry central perforation in membrane; never discharges; noises at times; low whisper heard at 15 feet.

C. Two cases with general blood infection but no thrombosis of the sinus.

(1) J. I., aged 20, admitted 30/10/16, with history of deafness and occasional pain in and slight discharge from right ear for six months. Pain over mastoid and top of head for one week. Patient fell to left side three days before admission. *Examination*—Inferior perforation in membrane; slight discharge, with polypus. 1/11/16—*Operation* (A. L. T.)—Pus in large tip cell; sinus exposed by disease but looks healthy. 4/11/16—Rise of temperature; no shivering. 5/11/16—Flush suggesting scarlet fever. 6/11/16—Rise of temperature. Organisms in blood same as in pus (Gram + diplostreptococci;

Schwartz Operation in Otitis Media

Gram + bacilli). 7/11/16—*Second Operation*, 8 P.M.; sinus opened; free bleeding; deep wall accidentally punctured; escape of cerebrospinal fluid. Vein not tied. 10/11/16—Temperature gradually falling; nystagmus has been present but has now gone; patient made good recovery. 13/7/20—Reports. Ear dry; hears raised whisper at 15 feet. Sometimes headache and giddiness.

(2) D. S., aged 13, admitted 22/3/14, with history of discharge in right ear on and off for two years. Eight days before admission, pain in both ears following cold. Two days before admission right ear discharged; on day before admission sickness and giddiness. *Examination*—Temperature 102, pulse 108; drowsy; marked mastoid tenderness; pus in meatus; inner ear tests normal. 23/3/14.—Temperature suddenly rose to 105. Nystagmus to affected side. No shivering. 5.30 P.M.—Nystagmus gone. Boy felt cold last night. *Operation* (A. L. T.)—Mucopus and soft bone mainly round antrum; sinus exposed, healthy; no perisinus abscess. 24/3/14—Slept well. Temperature 102, pulse 124 last night; sick after food. 25/3/14—Pain over internal malleolus; temperature 103; slight chilliness. Pain in muscle on inner side of thigh. Nystagmus, horizontal and rotatory, to right. 26/3/14—Pain and restricted 'movement on left side of chest. *Second Operation*—Sinus explored; free bleeding; internal jugular vein ligatured and divided. 27/3/14—Abscess over internal malleolus opened. Pain in chest; respirations rapid; lung solid, crepitations at base; very slight nystagmus. 30/3/14—Pus evacuated from wound in neck. 2/4/14—Lung still dull. No fluid in pleura. 6/4/14—Temperature rising; respirations rapid; pus in pleura; rib resected. 7/4/14—Temperature 98.4, pulse 80; doing well. 16/4/14—Temperature 102; pain in left thigh. 19/4/14—Abscess in thigh opened. 26/5/14—Doing well; discharged. (Pus from mastoid and thigh showed staphylococcus albus and streptococcus; in the empyema pneumococci present in addition.)

D. One case of meningitis. J. L., aged 30, admitted 18/9/16, with history of pain in right ear for one month following bathing; relieved by paracentesis; very deaf; neuralgic pains in temporal region; stiffness of neck all the time. *Examination*—Membrane bulging; thick yellow pus in meatus; no tenderness; slight neck rigidity; increased

Gladys A. A. Boyd

knee-jerks; ankle and patellar clonus; fundi congested; temperature 100.6, pulse 96; shivery feeling. 3.50 P.M., another chill; paracentesis — blood and pus (leucocytosis, 16,000). *Operation* (A. L. T.)—Sinus exposed, healthy. 20/9/16 — Patellar clonus; pain on deviation of right eye to left; fundi more congested. Leucocytes, 16,000. 21/9/16—Last night temperature 102; headache; suggestion of oedema in fundi; lumbar puncture—fluid turbid and under tension; pus cells in fluid; 20 c.c. withdrawn; 30 grs. urotropin in saline injected, caused marked pallor and pain down both legs. Leucocytosis, 15,000. 22/9/16 — Better; cerebrospinal fluid clearer, less tension. 23/9/16 — Kernig still present; knee-jerks active; patellar clonus left side; no tension in cerebrospinal fluid. 29/9/16 — Temperature down; feels better; fundi less congested; leucocytes 11,000. 13/10/16—Pain in head. Redness round auricle; erysipelas. 20/10/16 — Follicular tonsillitis. 4/11/16 — Furuncle in meatus burst. 11/11/16 — Local anæsthetic; plastic. 18/11/16 — Ear dry; wound healing; discharged. 18/7/20—Reports. Meatus narrow; ear dry; hears low whisper at 15 feet. General health good.

The following two cases have not been included amongst those with intracranial complications. In one there were signs of an early meningitis, stiffness of the neck, exaggerated knee-jerks, nystagmus and slight Kernig. At the operation, the dura was found exposed in the roof of the antrum, but appeared healthy. The cerebrospinal fluid was clear and under no tension. The simple Schwartze was done and the patient made a good recovery, without further interference. The ear is now dry and the hearing good. In the other case the sinus was accidentally opened while removing extensive disease towards the tip of the mastoid. A second operation was required to clear out purulent debris from the sinus, and to ligature and divide the internal jugular vein. The patient made a good recovery, and on reporting was found to have a dry ear and normal hearing.

Fatal Cases.—In eight cases there was a fatal termination, which was due to an intracranial complication—already present on admission in six cases and developing after operation in two cases. The particulars of the fatal cases are as follows:—

(1) Admitted with symptoms of acute otitis, and temperature 101. *Operation* (A. L. T.), sinus apparently healthy. Temperature remained high and remitting in character. Five days later

Schwartz Operation in Otitis Media

radical operation, sinus investigated, no clot found ; pneumonia ; death seven weeks later. No post-mortem.

(2) Admitted with symptoms of acute otitis, temperature 101. Operation (A. L. T.); nothing found to account for temperature and pain ; sinus exposed, healthy. Abscesses developed in left wrist and right elbow. Patient became delirious. Death occurred four days after operation. No post-mortem. The condition suggested general streptococcal blood infection with no local involvement of sinus.

(3) Admitted with symptoms of acute otitis and signs of general infection ; temperature 103. Operation, Dr Lithgow for A. L. T. Swinging temperature. Five days later sinus investigated. Death from anæsthetic half an hour after. No post-mortem.

(4) Admitted with symptoms of sinus thrombosis. Operation (A. L. T.); sinus opened, clot removed, jugular vein ligatured. Death five days later. Post-mortem—septic phlebitis of lateral sinus and meningitis.

(5) Admitted with symptoms of acute otitis ; temperature 101. Operation, Clin. Assist. ; usual appearances of acute case. Temperature fell. Sixteen days later the temperature rose again ; neck rigidity, discs swollen. Lumbar puncture and labyrinth operation (J. S. F.) ; drainage of subarachnoid space. Death. Post-mortem—acute purulent meningitis.

(6) Admitted with symptoms of acute otitis. Operation, (A. L. T.). Sinus healthy. Slow healing ; sent to Convalescent. Two weeks later returned with temperature 101, pulse 148, vomiting, albuminuria. Death three days later. Post-mortem—acute streptococcal meningitis ; nephritis.

(7) Admitted with symptoms of bilateral acute otitis and meningitis. Operation on right ear (A. L. T.) ; appearances of acute case ; sinus and dura of middle fossa healthy ; bone over cerebellar area soft. Lumbar puncture ; cerebrospinal fluid under great tension, clear. Death three days later. Post-mortem—sphenoidal sinus suppuration and osteomyelitis of sphenoid.

(8) Admitted with symptoms suggesting sinus thrombosis. Operation, (A. L. T.) ; sinus opened, clot removed, internal jugular vein ligatured. Optic neuritis and atrophy developed. Lumbar puncture, fluid clear but under pressure. Kernig present, knee-jerks absent. Three weeks after operation, temporo-sphenoidal lobe explored ; dura tense but pulsating ;

Gladys A. A. Boyd

no pus found. Death fourteen days later. No post-mortem. The condition suggested general œdema of brain associated with further venous thrombosis, but a temporo-sphenoidal abscess may have been present.

Results of Schwartze Operation.—In order that the final results might be obtained, the 164 cases discharged “cured” were asked to report at a period which varied from six months to six years after the operation. The usual difficulty was experienced in getting old patients to return for examination, and, out of 164, only 85, or 52 per cent., reported. This percentage is smaller than usual, owing probably, in part, to the war and resulting conditions. Patients were not asked to report by letter, as this has not been found to be satisfactory.

Local Appearances—Mastoid.—In 52 out of the 85 cases there was very slight or no depression in the scar. In 18 cases the depression was noticeable; there was marked depression in 13, and in one of these a discharging sinus was still present eighteen months after operation. In one case a keloid was present in the scar.

Meatus and Drumhead.—In 11 cases the canal was found to contain wax. The membrane was completely healed in 76 cases; in 23 of these it was almost normal in appearance, in 18 there was scarring, in 21 there was some retraction, 12 showed thickening and opacity, and in 2 chalk patches were seen. In 4 cases there was a dry perforation (one discharges when the patient has a cold), and in 4 other cases discharge was present. One case was found to have a recurrence of the acute otitis and had to be kept in hospital for further operation.

History.—On questioning the patients it was found that 5 had suffered from deafness and 3 from deafness and discharge following on a cold. Two suffered from deafness and noises in the ear at times; 5 had occasional pain over the mastoid region for which no cause could be found on examination; 1 case (sinus thrombosis) had occasional headache and giddiness; 1 case (cured meningitis) had headaches. In 1 case the swelling recurred four years after operation and required to be opened. In 2 cases the ears discharged during an illness, said to have been abdominal tuberculosis. One case is attending a special school for the deaf.

Hearing.—In 4 cases the patient was too young to have the hearing tests properly carried out. One of these heard a whisper at 15 feet and in all the cases the appearances

Schwartz Operation in Otitis Media

were satisfactory. (1) 40 patients were found to have perfect hearing; low whisper heard at 15 feet in room not absolutely quiet. In 3 of these Weber lateralised to operated ear. (2) In 13 the defect in hearing was very slight; slightly raised whisper at 15 feet. In 4 of these Weber lateralised to operated ear, and in 2 to unoperated ear. (3) In 16 cases the hearing was imperfect, but equal to that in the other ear; raised whisper to low voice heard at 15 feet. In 11 cases Weber's test was lateralised to operated ear. (4) In 7 cases the hearing was worse in the operated than in the other ear (which was normal in 5 and slightly defective in 2); raised whisper to low voice heard at 15 feet; Weber lateralised to operated ear in all cases. (5) In the remaining 5 cases the hearing was poor:—(i.) Both ears discharging, membranes practically absent; slightly raised voice heard at 15 feet, both ears; Weber lateralised to unoperated ear. (ii.) Nerve deafness; slightly raised voice heard at 15 feet; loss of high tones; Weber not lateralised. (iii.) Nerve deafness; raised whisper to low voice heard at 15 feet; loss of high tones; Weber not lateralised. (iv.) A cured case of perisinus abscess, showed marked scarring and retraction of membrane; raised voice heard at 15 feet; Weber lateralised to operated ear; in good ear raised whisper heard at 15 feet. (v.) The case mentioned above under "local appearances," with recurrence of acute otitis and mastoid swelling; whisper heard in bad ear at 3 to 4 feet.

The final results of the Schwartz operation may be regarded as satisfactory so far as they could be ascertained. When we consider that patients still suffering from aural discharge or marked deafness are more likely to report for examination than those whose ears do not trouble them, we are justified in assuming that we see the greater proportion of the bad results, and that the majority of those not seen are satisfactory.

Summary.—Of the 85 cases reporting, suppuration was cured and the hearing normal, or nearly so, in 53; the suppuration cured but hearing considerably reduced in 24; and in only 4 cases did suppuration continue, with markedly reduced hearing.

If we combine the present series of 188 cases with Dr Hewat's series of 200, the total number of acute cases which have been reported on is 388. The following figures obtained from the combined series may be of interest:—

In 56 cases (14.4 per cent.) there had never been discharge;

Gladys A. A. Boyd

in 28 (7.2 per cent.) discharge had been present but had ceased before admission. In the combined series 73 cases in all were found to have a temperature of 100° F. and over before operation, and in only 15 of these could the ear condition alone be found to account for this rise in temperature.

The cases which came to the radical operation later numbered 25 (6.4 per cent.).

In the series of 388 there were 15 (3.9 per cent.) definitely acute uncomplicated cases in which the Schwartze operation failed.

Of the 206 cases in which the final results were obtained (15 of these, in Dr Hewat's series, reported by letter), the suppuration was cured in 158 (76.7 per cent.).

With regard to hearing after operation, 98 of the 191 cases who reported personally (54 per cent.) showed perfect hearing; in 46 (24 per cent.) the hearing was not perfect but was equal to that of the other ear; in 24 cases (12 per cent.) the hearing was worse than that of the other ear. Of the remaining 21 (11 per cent.), 17 were too young for hearing tests, 2 were deaf-mutes, and in 5 the hearing in both ears was poor.

In the combined series there were 42 cases of intracranial complication, 24 of which recovered and 18 died. The causes of death (18) were as follows:—Meningitis, 7 (in at least 2 of these labyrinthitis was also present); septicæmia, 2; anæsthetic, 2; lateral sinus thrombosis and lung complication, 1; cerebellar abscess and meningitis, 1; pneumonia, 1; septic phlebitis of lateral sinus and meningitis, 1; acute streptococcal meningitis and nephritis, 1; meningitis, sphenoidal sinus suppuration and osteomyelitis of sphenoid, 1; general œdema of brain associated with venous thrombosis, 1.

In conclusion I wish to express my gratitude to Dr Logan Turner and Dr J. S. Fraser, for their kind assistance and for their permission to record these cases.

DIAGNOSIS OF DISEASE OF THE OTOLITH APPARATUS.*

By Professor R. BÁRÁNY, Upsala, translated by Dr ALEX. R. TWEEDIE, Nottingham.

TILL now it has not been possible to diagnose disease of the otolith apparatus. A short time ago, however, I succeeded in establishing this diagnosis by means of some very simple investigations, and I hope that therewith further developments in the knowledge of the vestibular apparatus will be elaborated.

My remarks are based on the following case which came under my observation at the aural clinic in Upsala:—A woman, aged 27, had suffered with headaches for the past year. The hearing, the caloric reaction on each side, and the neurological condition were normal. Rheumatoid thickening of the neck and shoulder muscles was present. For the last fourteen days attacks of giddiness had occurred. My assistant, Dr Karlefors, was the first to observe that these attacks only took place when the patient was lying on the right side. During the attacks there appeared a marked rotatory nystagmus to the right with an upward-directed vertical component—the nystagmus became purely rotatory on directing the eyes to the right, and purely vertical on directing the eyes to the left. The attack lasted about half a minute and was accompanied with great giddiness and discomfort. If, however, immediately after the cessation of an attack the head were again turned to the right, no such phenomenon could be induced, and it was necessary for the patient to lie on the back or the left side for a little while before these results could be again evoked. So far there is nothing particularly new in the observation. Oppenheim, Bruns, and myself described similar attacks of giddiness and nystagmus many years ago—and I have assumed that these were referable to the semicircular canal system. In this particular case, however, I carried out a series of small experiments which led further.

When I first examined the patient she was lying on the left side with left cheek on the pillow. If now the patient's head were turned towards the right, but not further than the middle line, no giddiness or nystagmus occurred, even although a long pause had intervened after one of her attacks.

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R. Bárány

On the other hand, nystagmus was immediately induced if the head were inclined even the slightest towards the right. It was thus obvious that the same movement produced no effect in the first instance, but gave rise to a marked nystagmus in the second test. I now made the following control experiment. If the position and not the movement were the causation of the giddiness, it should make no difference how this "Giddiness-Area" was stimulated. I accordingly made the patient sit up and first of all lean the head on the left shoulder. If now after a sufficient pause she quickly raised the head erect no nystagmus was seen. This, however, immediately appeared if she inclined her head towards the right shoulder and thus stimulated the "Giddiness-Area" in the same way as occurred when she turned the head to the right when lying on the back. By this simple test it was, therefore, made clear that it was not movement but position alone of the head which induced the nystagmus, and that the disease must be located in the apparatus which would be thus affected by the consequent pressure.

From investigations carried out by Magnus and de Kleijn in Utrecht lately (*Ber. iib. d. ges. Physiologie*, Bd. II., 1920), it is now clear, that we are here concerned solely with the otolith apparatus. Magnus continued a research which Wittmaack had instituted in 1910. Wittmaack subjected guinea-pigs to extreme rotation (2000 revolutions per minute) and demonstrated thereafter that the otolithic membrane, whose specific weight is greater than that of the endolymph fluid, was detached, and in the subsequent histological examinations found separated from its nerve endings. Wittmaack had also investigated the function of the vestibular apparatus in these animals, but his research was insufficient for him to draw definite conclusions therefrom.

Magnus repeated the experiments and demonstrated that, in those animals, when the otolith membrane was actually detached, all so-called compensatory eye movements (that is the reflex of position) were absent, whilst the movement reflex (that is the semicircular canal reaction) was present. If the results of this research, which up till now have not been fully published, are regarded as indisputable — of which I have no doubt — it is now established that the compensatory eye movements are referable to the otolith apparatus. In men it is only possible generally to observe one aspect of this compensatory eye movement — namely, the rolling of the

Disease of the Otolith Apparatus

eyes in the opposite direction to the inclination of the head. This opposite-rolling reflex I studied in 1906 and elaborated a special apparatus for its accurate measurement. At that time, however, I came to the conclusion that this reflex also could be attributed to the semicircular canals — this only entailed the assumption that the cupulæ which rest on the cristæ of the ampullæ of the semicircular canals had a different specific weight from the endolymph, in order to support the possibility or rather the probability that these reflexes were referable to the semicircular canals. Such explanation is now condemned by the result of the research of Wittmaack and more especially Magnus, and we must now accept the "opposite-rolling" of the eyes as an otolith reflex. Thus, too, the investigation of this phenomenon becomes of added interest.

I would take this opportunity to mention that, in 1913, I described a phenomenon which has some bearing on the matter in question. This referred to a patient with multiple sclerosis in whom a left-directed horizontal nystagmus could be induced by laying him on his right side, which nystagmus however—in contradistinction to the particular form of nystagmus to-day described—did not cease after half a minute, but continued so long as the patient remained in this position (*Monat. f. Ohrenh.*, 1913, p. 481), *vide infra*. Similar phenomena are observable in rabbits, a fact which at once prompted me to give attention to these symptoms in men. Rothfeld, once a pupil of mine and now a neurologist in Lemberg, has discovered that rabbits under the influence of acute alcohol intoxication developed a horizontal nystagmus if laid on the side, and at that particular period of the intoxication when the compensatory eye movements were inhibited with placing them in this position (*Arch. aus d. neurol. Institut.*, Wien, Bd. xx., 1912). Having regard to these experiments, I presume also that in patients with multiple sclerosis the ataxia would cease if the head were inclined towards the right [? or left] shoulder. I have not yet had the chance of testing this point. It must now be our duty to observe if these attacks of nystagmus on quick movement of the head are always referable to the otolith apparatus, and more especially to determine which particular symptoms in the pathology of the vestibular symptoms are really attributable to the otolith apparatus.

[The case of multiple sclerosis referred to by Bárány was described by him at the Meeting of the Austrian Otological

R. Bárány

Society held on 27th January 1913, under the title of "Constant Variation of Spontaneous Nystagmus in accordance with Variation in the Position of the Head."]

The case, which I now wish to bring before you, shows a phenomenon, which, so far as I know, has not yet been described in detail in men.

The patient who suffers from multiple sclerosis, has, with the erect position of the head, a coarse, horizontal rotary nystagmus to the left, when the eyes are directed to the left; and a fine nystagmus to the right, when the eyes are directed to the right. There is no by-pointing, the caloric reaction on both sides is prompt; but no obvious rotary component of the nystagmus to the right appears with cold water irrigation of the left ear. Rotation affords an analogous nystagmus. With the head inclined backwards, rotation induces only slight rotary nystagmus to the right, but a very marked rotary nystagmus to the left. After ten rotations to the right, with the head bent backwards, there appears, first (for a few seconds), a rotary nystagmus to the right, which is then followed by an obvious marked rotary after-nystagmus to the left. Rotation to the left affords a marked rotary after-nystagmus to the left, but no rotary after-nystagmus to the right. The hearing is normal.

The new phenomenon, to which I would now direct your attention, exists in the fact that with the eyes directed forwards, the patient shows no (or only exceedingly slight) nystagmus to the left, but, if the head be inclined to the right (and even when this action is carried out quite slowly and gradually) there appears a fairly marked horizontal nystagmus, with a slight rotary component towards the left, which, if the head is maintained in this position, continues undiminished for a long time. I have repeatedly witnessed this unaltered action for five minutes. The same phenomena are induced if the patient, when lying on his back, turns quite slowly on his right side. The nystagmus is accompanied by by-pointing of both arms to the right and slight giddiness. If the head is inclined to the left a much weaker but still definite horizontal nystagmus towards the right is induced, which in the same manner is maintained undiminished and is accompanied by definite, but less marked, by-pointing of both arms to the left.

Such continuation of nystagmus, resulting from change of the position of the head, has not yet been described in men. I have, however, already seen a second similar case, and as far as my memory serves me, would expect that these cases are

Disease of the Otolith Apparatus

not so uncommon. Attention has not been directed to this condition up till now, and it is my belief that most of these "continuing" variations of nystagmus have been confused with the shorter attacks of nystagmus, the result of quick movements of the head. Nystagmus attacks, following quick head movements, were first observed and described by Bruns and Oppenheimer. Bruns considered, however, that they should be regarded as a symptom of cysticercus infection of the fourth ventricle. Oppenheimer describes them as symptoms of cerebellar tumour. I have found them, however, just as much in association with circumscribed labyrinth disease as with multiple sclerosis, cerebellar tumours, and cysticercus of the fourth ventricle. These attacks and their probable explanation I have myself already described. I regarded them as due to the non-occurrence of some inhibition, and considered that the nystagmus, elicited on moving the head, thus continued even after this movement ceased. These attacks however differ, in that the nystagmus so caused, in a short time disappeared; whilst in the case in question we have to do with a "continuing" nystagmus.

My attention was directed to the possibility of such nystagmus by the animal tests of Rothfeld. Rothfeld observed that a "continuing" horizontal nystagmus occurred in rabbits, under the influence of alcohol, when laid on the side; the nystagmus was directly associated with paralysis of the normal deviation, which resulted from the position of the animal on its side.

A "continuing" nystagmus, which is dependant on the position of the head and varies with the position of the head, can only be due to a definite "continuing" stimulus, dependant on such position of the head; and such stimulus can be no other than the action of gravity; as would be the effect of pressure on the cupulæ and otoliths. But what is the reason that this nystagmus is not seen in normal people? Can it be that intoxication, or in my case, disease, must first invoke the occurrence of such stimulus? No, certainly this stimulus must be continually present in normal people—that it does not cause nystagmus can only be referred to the fact, that in normal people it is balanced. The stimulus which causes, for example, a left-directed nystagmus, is balanced by an opposing action inducing nystagmus to the right. Intoxication, that is disease, must thus either paralyse the opposing nystagmus or enhance the stimulus producing nystagmus to the left. In rabbits Rothfeld was indeed able to observe a paralysis, that is a paralysis of

R. Bárány

deviation, which synchronised with the occurrence of the nystagmus, due to the lateral position. In my patients I have not been able to detect such obvious paralysis; it is, however, possible that the rolling of the eyes in the opposite direction on inclination of the head, is paralysed, but this at present is pure conjecture. A further question is, with what particular nervous route is this paralysis associated?

With the nystagmus to the left, in my case, by-pointing with both arms, corresponding to the nystagmus, is present; thus the necessary stimulus must arise in the ganglion vestibulare of Scarpa, that is the peripheral end organs, if Cajal is correct.

If we suppose that the stimulus does exist in normal people, and that in pathological cases the balance is uncontrolled owing to the absence of an antagonistic stimulus, we could conclude that the antagonistic stimulus must be controlled at its origin, that is, in the ganglion vestibulare; in that case, such control would lie wholly within the extension of Deiter's nucleus, that is Bechterew's nucleus. By this hypothesis the occurrence of the nystagmus can be explained, but not however the occurrence of the associated by-pointing. We are therefore constrained either to assume that the paralysis has its origin in the ganglion vestibulare of the vestibular nerve, or that a paralysis of Deiter's nucleus depresses by centrifugal action the excitability of the corresponding cells in the ganglion vestibulare.

In this connection I should like to acknowledge my thanks to Professor Dr H. Schlesinger, who has repeatedly investigated pathological foci of the acoustic nerve in cases of multiple sclerosis.

You will see how deep an insight into this complicated mechanism is demanded for an accurate study of these phenomena. Certain conclusions will not be reached until we know, after exact confirmation of Cajal's account, the anatomical condition of the parts concerned, and we may be able also to adduce explanations by accurate histological research on pathological cases under observation.

[It may also be valuable for the reader, especially interested in this subject, to refer to the proceedings of the Meeting of the Austrian Otological Society 30th May 1910, *Monats. f. Ohren.*, vol. 44, No. 6, or a translation of these reports, published in *The Journal of Laryngology, Rhinology, and Otology*, 1911, page 157, *et seq.*—A. R. T.]

CLINICAL RECORDS

THE RÔLE OF THE TONSILS IN CERTAIN CASES OF DIPHTHERIA "CARRIERS."

By HERBERT TILLEY, B.S., F.R.C.S.

THE question of the best method of dealing with a "carrier" of the Klebs-Löffler bacillus is one which is surrounded with difficulties which are not only of therapeutic interest, but which involve issues of social and economic importance. It must be within the experience of all of us to have been consulted by patients (or by their relatives) who have quite recovered from an attack of diphtheria and even from one or more of its sequelæ, and yet who are neither able to resume their ordinary social relationships nor to return to their daily work. We are asked, "What can be done to destroy the germs?" and the question is often partly answered by the patient, in such a statement as "I have had douches for the nose, gargles, pigments for the throat, and vaccines, and still they say I am infectious."

In three cases of this nature which have come under my care and in which vaccines and local applications had failed to destroy the bacilli, I enucleated the tonsils by dissection and in each instance the specific organism disappeared within a few days.

CASE I.—In 1913 I was asked to see a girl, aged 18 years, who had been an inmate of one of the London Fever Hospitals for fourteen months. She could not be discharged because she was a "carrier" of Klebs-Löffler bacilli, consequent upon an attack of faucial diphtheria for which she had been admitted. Three weeks after enucleation of the tonsils she was discharged as cured, as two bacteriological examinations of the throat taken at intervals of four to five days proved to be negative.

CASE II.—In October 1915 I was consulted by Miss E., aged 29, who had had an attack of faucial diphtheria in the previous July. Under antitoxin treatment she recovered without any complications but she remained a "carrier" in spite of local treatment and excellent hygienic conditions in the country. I saw her during the last fortnight in October and expressed septic material from the lacunæ of the tonsils, and as this contained Klebs-Löffler bacilli she

Herbert Tilley

consented to have the tonsils enucleated. The operation was performed during the last week of October, and I quote from a letter received from her on 21st November—"I did not want to trouble you with two letters, so I thought I had better wait till I had heard the results of the examination of the two sets of swabs from the nose and throat. Dr H—, of H— G—, Sussex, who took them for me (with a week's interval between), sent them to Dr B— in Harley Street to be examined, and I am most thankful to say they are both entirely free from diphtheria germs. It is a tremendous relief, and . . ." The expressions of gratitude which followed the above statement were in no small degree due to the fact that the patient was enabled to return to her work as a "land girl."

CASE III.—On 10th March 1920, I was asked by Dr R. of Hampstead to see his patient, Mr V. D., aged 23, who was anxious to go in for his final law examination, but Dr R. doubted whether this would be possible because he was a "carrier," and the examination was near at hand. The patient developed diphtheria on 28th December 1919, and recovered under the usual antitoxin treatment, but no local measures had succeeded in destroying the Klebs-Löffler organisms.

On 10th March I found the tonsils congested, with septic debris filling many of the crypts, and on 14th March I enucleated the tonsils by dissection.

Swabs were examined on 29th, 30th, and 31st March, and were found to be negative, and the patient shortly afterwards successfully passed his examination "for the law."

I should be sorry if the publication of these three cases were to create the impression that the only cure for a diphtheria "carrier" is enucleation of the tonsils; on the other hand, it is a question which should receive careful consideration when simpler methods have failed. After all it is a reasonable practice because we cannot conceive that the bacilli could live and propagate except in the sheltered and more or less inaccessible lymphoid recesses of the fauces or nasopharynx. What more favourable nests can be imagined than the septic crypts of the tonsils or in the lymphoid structures of the nasopharynx?

My object in publishing these cases is to offer a suggestion as to the cause of failure to cure certain intractable cases of "carriers" rather than to lay down a general principle applicable to all cases.

TWO CASES OF TRAUMATIC ADHESION OF THE SOFT PALATE TO THE POSTERIOR PHARYN- GEAL WALL FOLLOWING REMOVAL OF TONSILS AND ADENOIDS; RE-ESTABLISHMENT OF NASAL RESPIRATION BY OPERATION.

By A. LOGAN TURNER, M.D., F.R.C.S.E.

CASES of injury to the soft palate and posterior pillars of the fauces consequent upon operations on the tonsils either with the guillotine or by dissection present themselves, from time to time, to the laryngologist. His advice is sought by the parents of the child on account of the persistence of nasal obstruction, which may, indeed, be more pronounced than it was prior to the operation.

The appearances observed on examination of the throat vary according to the amount of trauma that has been inflicted, but the outstanding feature is the adhesion of the soft palate and pillars to the posterior wall of the pharynx, while the normal communication between the pharynx and the nasopharyngeal space is reduced to a small aperture.

The very satisfactory results which may be obtained in treating the condition by the simple procedure which has been described by Mr Herbert Tilley, have led me to record two cases of this nature dealt with along the lines which he has recommended and employed.*

CASE I.—A girl, aged 16, had her adenoids removed and her tonsils enucleated by dissection in January 1920. Subsequent to the operation there was considerable distortion of the soft palate with the formation of adhesions, so that nasal respiration became very much interfered with. When the child was examined in September of the same year, only a small central aperture, admitting the introduction of the end of Killian's frontal sinus protector, remained as an airway between the nose and throat.

Under chloroform anæsthesia, the adhesions to the posterior wall of the pharynx were divided with probe pointed scissors curved on the flat. The finger was then introduced behind the palate in order to ascertain if the separation was complete. A cleft palate needle with an antero-posterior curve was threaded with a loop of silk and passed

* *Diseases of the Nose and Throat*, 4th edit., 1919, p. 383.

A. Logan Turner

from before backwards through the whole thickness of the right half of the soft palate close to its attachment to the hard palate. The loop of silk thread was drawn into the mouth and a piece of fine pliable silver wire was fixed to it: the wire was now pulled from behind forwards through the soft palate and then detached from the silk. The two ends of the wire, the upper lying close to the hard palate, the lower curving round the free margin of the soft palate, were then pulled tightly forwards, thus drawing one half of the palate away from the posterior pharyngeal wall. The extremities of the wire were anchored by twisting them round the upper lateral incisor tooth of the same side, care being taken to prevent the cut ends from projecting and injuring the mucous membrane of the upper lip. The same procedure was next carried out upon the left half of the soft palate, the ends of the second wire being twisted round the left upper central incisor.

As a precaution the child's hands were tied to the bed until she had completely recovered consciousness and had the position explained to her. A mouth wash was used frequently, and no solid food was given until the stitches were removed. This was done on the fifth day, when it was observed that the stitch on the right side had begun to cut through. For ten days after the operation the index finger was passed into the naso-pharynx and the soft palate hooked forcibly forwards. This step in the after-treatment should not be neglected as it conduces to the success of the operation. The result in this case is all that could be desired; the mobility of the soft palate is good and nasal respiration is re-established.

CASE II.—A girl, aged 14, had her adenoids and tonsils removed when she was seven years of age. No information could be obtained as to whether the guillotine or the scissors and snare had been employed. She was a mouth breather: nasal obstruction appeared to be more or less complete. The soft palate, part of the free margin of which on the right side of the uvula had been destroyed, was adherent to the posterior pharyngeal wall throughout its whole breadth, with the exception of a small chink in its left half.

An operation was performed similar to that first described, and an equally good result can be recorded three months later. A difficulty in fixing the wire in this case was met with, to which attention should be drawn. Owing to the small size and close approximation of the incisor teeth, the attachment of the wires slipped shortly after the child had been put back to bed. Silk threads, therefore, were attached to the wires brought over the face and fixed to a circular band round the head, and in this way the necessary pull upon the soft palate was maintained.

SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTIONS OF ANÆSTHETICS AND LARYNGOLOGY

COMBINED MEETING.

February, 1920.

President—Dr LLEWELYN POWELL.

ABRIDGED REPORT.

Discussion on Anæsthesia in Throat and Nose Operations.

Dr F. S. ROOD.—An active co-operation and partnership between the surgeon and anæsthetist, and an appreciation and sympathy with the "steps" of each other's work, are not only essential to the success of the operation, but are vital to the safety of the patient. We do not get mysterious deaths during the induction of ether. The evidence that ether is the safer drug is so overwhelming that I think there are few surgeons or anæsthetists nowadays who would differ from this view. It is the proper anæsthetic for operations upon the nose and throat. There are two degrees of anæsthesia, deep and light. In deep anæsthesia all reflex activity of the pharynx and larynx is abolished. In light anæsthesia I do not, of course, mean a struggling patient. There is general muscular relaxation; the respiration is regular, but certain reflexes persist.

Operations upon the nose and throat stand out in marked contrast to all others in that blood can pass directly into the air passages. There are three alternative methods of preventing the blood entering the larynx:—

- (1) To use light anæsthesia and allow the patient to cough up his own blood.
- (2) To shut off the nasal cavities from the pharynx by means of a well-fitting post-nasal plug—using at the same time one of the many forms of mechanical breathing tubes.
- (3) By using the intratracheal insufflation of ether.

The next anæsthetic technique to consider is associated with the removal of tonsils and adenoids. There are from the anæsthetist's point of view two methods of removing tonsils—one with light anæsthesia, the other with deep anæsthesia. The first, or rapid method, consists in the removal of both tonsils with the reverse guillotine, the patient either lying on his back or sitting up. The

Societies' Proceedings

profound anæsthesia necessitates some mechanical means to keep blood out of the air passages. In the special operation under discussion this end is secured in a very simple manner. The shoulders are raised upon a sandbag. The head is allowed to fall back and rest upon the vertex in such a manner that the front of the chest, the front of the neck and the chin are all in one straight line. Carried out by two people who are conversant with the details, the method is mechanically perfect. For direct examination of the larynx, trachea, and œsophagus by means of tubes, a profound anæsthesia is essential. Ether is the proper anæsthetic to employ.

Mr HERBERT TILLEY emphasised the greater safety of ether and advocated in tonsil removal the supine position of the patient with a sandbag under the shoulders so that the head falls backwards.

Dr WILLIAM HILL drew attention to the use of chloride of ethyl in the production of a rapid anæsthesia for tonsil operations.

Dr SILK pointed out that the period of ether induction can be shortened and the quantity used diminished by adding to it 3 per cent. chloroform. The combination has the further advantage in that it reduces the congestive hæmorrhage.

Mr STUART LOW emphasised the necessity of careful preparation of the patient, of silence during administration, and the value of team work.

Dr WATSON WILLIAMS said that in Bristol ether had been advocated for many years in operations on the upper air passages.

Sir WILLIAM MILLIGAN used Kuhn's peroral intubation tube on all possible occasions, as it precluded any risk of blood entering the air passages, if packing was properly adjusted. He commented on the great danger of injecting adrenalin into the tissues when general anæsthesia was used.

Mr BOYLE referred to combinations of anæsthetics and their sequence in administration. Gas-oxygen-chloroform sequence was used in diathermy operations.

Mr HAROLD BARWELL considered ether to be the best anæsthetic in nose and throat operations.

Dr BROWN KELLY continued to use bromide of ethyl in adenoid and tonsil operations, administered in the sitting posture.

Dr M'CARDIE described Mr Seymour Jones' method of maintaining anæsthesia during nasal operations.

Royal Society of Medicine

SECTION OF LARYNGOLOGY

February 6, 1920.

President—Mr E. B. WAGGETT, D.S.O.

Adeno-fibro-myxoma of the Nares and Naso-pharynx, removed by Lateral Rhinotomy—Mr C. FIRWIN CUTHBERT.—Male, aged 30, examined in August 1917, with an extensive tumour occupying both nasal cavities, maxillary and frontal sinuses, with a large portion resting against the body of the sphenoid. A further extension into the frontal cavity of the skull reaching about half-way up the frontal bone and lying upon the dura mater, was found at the operation. The whole tumour was shelled out of all the cavities without hæmorrhage, the external carotid arteries having been first clamped. Laryngotomy was performed and the pharynx plugged.

Exophthalmic Goitre: Thyroidectomy—Mr C. FIRWIN CUTHBERT.—Male, aged 19, seen May 1912, suffering from enlarged thyroid, polyuria, and intense thirst; no glycosuria. He had lost 4 stone during two years. Thyroid removed under local anæsthesia. Patient afterwards served in the army and was killed in November 1917.

Pharyngeal Diverticula: Report of Two Cases—Mr HORACE LAW.—CASE 1. Male, aged 53. Began to notice slight gurgling on swallowing liquids and an undue amount of saliva in his mouth; occasional attacks of choking when swallowing meat. X-ray and barium meal examination showed filling up of pouch followed by evacuation of the barium and its passage down the gullet. The mouth of the pouch was at the lower border of the cricoid plate and slightly to left of the mid-pharyngeal plane. The pouch was ligatured and excised.

CASE 2. Female, aged 70. Her only symptom was a constant accumulation of saliva. In this case the symptom was due to the impaction for seven months of a piece of cabbage stalk in the mouth of a very small pouch: granulation tissue had formed, giving the appearance of a fungating cancer. After removal of the foreign body the patient reported herself as normal.

Perithelioma (Alveolar Sarcoma) of the Frontal Bone—Mr H. LAWSON WHALE.—Male, aged 54, with a hard swelling in the region of the left eyebrow, displacing the eyeball outwards and downwards. Duration of history, three years. The growth was found, at operation, to extend along the orbital roof and to erode the outer wall of the frontal sinus without perforating it. The affected part of the sinus wall was removed with the tumour.

Societies' Proceedings

Malignant Disease of Upper Jaw: Lateral Rhinotomy—Mr C. W. M. HOPE.—Male, aged 49. The tumour, which was an epithelioma, involved the left antrum and superior maxilla, the ethmoid, which was its seat of origin, the bony orbital floor, the malar bone, and the soft tissues in the pterygoid region. The disease was removed by Moure's operation, and radium and X-ray treatment carried out.

Laryngeal Case for Diagnosis—Dr ANDREW WYLIE.—Female, aged 47. Complained of some difficulty in swallowing for fifteen years, increased during the past twelve months. Swelling and œdema of both arytenoids with a small ulcerated area.

In the discussion, the opinion expressed by all the speakers was in favour of the condition being that of post-cricoid carcinoma.

Actinomycosis? of Tonsil—Mr COUBRO POTTER and Major MARRIAN PERRY, R.A.M.C.—Gunner G. reported in October 1919 with an ulcerated throat: no diphtheria or Vincent's organisms: no syphilitic manifestations: Wassermann negative. Later, malignant disease suspected. Piece of tonsil removed for microscope: maxillary glands enlarged. Patient frequently sucked a piece of straw. Microscopic sections showed typical colonies of a streptothrix organism situated in the superficial layers of the tissue, the whole of the tonsillar structure showing signs of chronic inflammation. Exact species of streptothrix not yet determined. Large doses of iodide of potassium had been recently given.

Lingual Cancer in a Man, aged 65, treated with Copper Alanine—Dr JAMES DONELAN.—Patient shown at previous meetings. The progress of the disease appears to be arrested.

Drs Dan M'Kenzie and Douglas Harmer commented on the action of the copper alanine, believing that the benefit which followed its use was due to its power of sterilising the tumour by destroying the septic organisms.

Lupus of the Tongue and Larynx—Mr T. B. LAYTON.—Male, aged 20. No evidence of tuberculosis of the lungs. A piece of tissue removed from the tongue showed tuberculous granulation tissue.

Atrophic Catarrh of the Trachea—Mr LIONEL COLLEDGE.—Male, aged 36. The posterior wall of the trachea was covered with dry crusts down to the bifurcation. There was no crusting seen in the nose, nasopharynx, or on the vocal cords at repeated examinations.

Cyst of the Floor of the Nose—Mr G. W. DAWSON.—Girl, aged 21. A cystic swelling on the floor of the right nostril contained clear, straw-coloured fluid.

Royal Society of Medicine

Sections removed from a Papilloma of the Larynx with a Malignant Tendency, with Recurrence after a Period of Two or Three Years as an Epithelioma of the Opposite Cord—Mr H. BUCKLAND JONES.—Male, aged 75. Section of growth removed from left cord in 1913 reported as papilloma. Another section from the same piece reported as papilloma becoming epitheliomatous. Section of tissue removed from right vocal cord in 1916 appeared to be a definite epithelioma.

SECTION OF OTOTOLOGY

November 21, 1919.

President—Mr HERBERT TILLEY.

ABRIDGED REPORT.

President's Address.—The Teaching of Otolaryngology, Rhinology, and Laryngology in the Medical Schools of the United Kingdom (published in *The Lancet*, London, 6th December 1919).

Malformation of the Stapes—Professor S. G. SHATTOCK, F.R.S., and Dr S. R. TATTERSALL.—Malformations of the ossicles are extremely rare. The left stapes here described exhibits a form of hypoplasia. There were other defects of the same class present in the head, *e.g.*, cleft palate and bilateral hare-lip. The footplate is reduced to an oval process 1.7 mm. by 1.3 mm. in diameter, in which the anterior crus is inserted, the rest of the base being absent. The other crus terminates in a free, slightly bulbous end. The long axis of the footplate lies at right angles to the anterior crus. The head and neck are normal. The fenestra ovalis corresponds precisely with the footplate of the malformed stapes. The nearest approach to the malformation here recorded is the closure of the crus (columella formation) referred to by Politzer.

DISCUSSION.

Dr ALBERT GRAY.—There is no stapes in any mammal similar to this except in the Monotremes, in which a miniature columella is inserted in the middle of the footplate. No reptile has got a columella like that, but in one of the frogs there is an appearance somewhat similar. Mr W. STUART-LOW and Mr SYDNEY SCOTT also spoke.

Congenital Redundant External Meatus; Repeated Abscess Formation; Excision—Dr DAN M'KENZIE.—Boy, aged 7. At birth his doctor noticed a redundant auricle on the *right* side. At one year, the child developed an abscess behind

Societies' Proceedings

the *left* auricle, which pointed both into the meatus and also behind and below the auricle. This was curetted by Mr George Wilkinson, who suspected that he had to deal with a suppurating dermoid cyst. In spite of three further operations, M'Kenzie found a sinus discharging pus in the lower mastoid region and another in the postero-inferior wall of the external meatus. The tympanic membrane was normal. By a post-aural incision, what seemed to be an additional external auditory meatus was removed (in two pieces). It lay anterior to the mastoid and below the normal meatus. No difficulty was experienced in effecting the separation of the two canals. The opening of the accessory meatus into the external meatus was quite minute. Dr Wyatt Wingrave reports: "This specimen shows all the elements of an aural meatus, but distributed most erratically." M'Kenzie has traced eight somewhat similar observations, but the cases in which the congenital nature is clear amount only to four.

Hysterical Deaf-Mutism of Eighteen Years' Duration—

A. F. HURST and W. M. MOLLISON.—Male, aged 18, heard perfectly well as a small baby. The deafness began after a slight illness or a fall on his head between the age of three and nine months. A number of aurists were consulted and stated that he must have been deaf from birth. The patient speaks like a deaf-mute. Hurst found that the vestibular reactions were perfectly normal. It was therefore explained to the patient, by the aid of lip-reading, that he could not hear because he had never tried to listen, and that if he once made the effort he would begin to hear. On the first occasion he was taught to listen sufficiently to hear his name pronounced. The same day he heard his bicycle bell. During the next three weeks he learned to hear a number of words. Each word had to be taught separately as it conveyed nothing to him until he realised what the sound meant by lip-reading. When once learned he could understand a word on a future occasion.

DISCUSSION.

Dr DAN M'KENZIE.—The test for functional deafness by means of vestibular tests has been very severely, even violently, criticised, and with justice. There are cases of nerve deafness in which the caloric tests are normal, and yet there is no reason to suppose that the deafness is other than organic. I think we may say that, when the caloric test is normal in undoubted severe or absolute nerve deafness, there is a presumption that the case is functional. I believe functional deafness to be much more common than some people think. When people are seriously deaf from an organic lesion there is also a functional element—a dulling of the nerve centres, so that they gradually become inert. It is those cases which respond to many forms of treatment which we decry.

Royal Society of Medicine

THE PRESIDENT.—I wonder whether "domestic deafness" may not be of this functional type. The husband does not hear his wife, or the wife her husband, but each hears anyone else without difficulty.

Dr KELSON.—I recall the case of a lady with catarrhal deafness. She got much better, but on hearing that her favourite child had to be operated on she became stone-deaf suddenly. She regained her hearing after the child recovered.

Vertigo: Radical Mastoid Operation—Mr W. M. MOLLISON.—Male, aged 36. Eight years ago a radical mastoid operation was performed on the left side and there is still some discharge. Granulation present in oval window. The patient is extremely deaf. No spontaneous nystagmus. Caloric reaction normal on both sides. I ask if operation on the left labyrinth would cure the attacks of vertigo?

DISCUSSION.

Dr DAN M'KENZIE.—I had a precisely similar case. I think it a functional case, but the patient cannot work.

Dr DUNDAS GRANT.—I suggest small doses of quinine to quiet the more sensitive of the two labyrinths.

Traumatic Facial Paralysis produced in an Unusual Way—Dr H. J. BANKS-DAVIS.—Boy, aged 8, was climbing a wall, when he fell and was impaled on a fine-pointed iron spike which perforated the tip of the mastoid process and produced instant facial paralysis. Reaction of degeneration was complete, and the face is still paralysed after three months' electrical treatment. Hearing is unaffected.

Traumatic Destruction of One Labyrinth illustrating the "Marking-Time" Test—Dr J. DUNDAS GRANT.—Male, aged 29, fell 20 feet in March 1919, and was unconscious for thirteen days. Deafness almost complete on the right side and slight on the left. All signs point to elimination of the right labyrinth. There is no Romberg symptom, but on "marking time" with his eyes shut he turns round to the right.

Ossiculectomy—Dr J. DUNDAS GRANT.—Female, aged 21, was shown some months ago soon after removal of her ossicles. Before operation she had C.O.M.S., with vertigo and headache. Large perforation of membrana tensa and also of the attic. Cholesteatoma bulged from the latter opening. After ossiculectomy the vertigo disappeared.

CASE II.—A middle-aged male had deafness (right ear) and discharge of two years' duration. Lately, giddiness. Attic disease present. A week after ossiculectomy he reported himself much easier.

Societies' Proceedings

DISCUSSION.

THE PRESIDENT.—Ossiculectomy seems to be a suitable subject for a general discussion. The tympanum of the man looked clean, but there was pus in the ear of the girl. To-day I saw a case in which an assistant removed the ossicles. He used an incus hook and severed the facial nerve. The face is still paralysed.

A Useful Attic Syringe—Dr J. DUNDAS GRANT.—The syringe resembles that of Milligan but is adapted to a U-shaped tube capable of holding 10 minims of alcohol or other liquid. It is provided with an india-rubber tube and glass mouthpiece. The liquid is drawn up into it by suction. I have been impressed by the number of cases of attic disease presenting themselves at the Pensions Clinics.

January 16, 1920.

On Some Anatomical Features of the Vestibule not Previously Recorded—Dr ALBERT A. GRAY.—*Method*: The petrous portion of the temporal bone is sawn across with a fine fret-saw in a plane parallel with the footplate of the stapes. Bone-dust is removed by running water. The preparation is then dehydrated in absolute alcohol, and finally is put into pure zylol. This method shows that the footplate of the stapes and the tissue in the vicinity of the oval window are composed of a mixture of bone and cartilage. The writer thinks that the cartilaginous element in the adjacent portions of the wall of the vestibule has not been described hitherto. The cartilage is probably a remnant of the original foetal cartilaginous capsule of the labyrinth. The islets of cartilage found in the cochlear portion of the wall of the labyrinth are supposed, by some, to be a causative factor in otosclerosis. They probably play a part that is passive rather than active. These preparations also show the deep cleft which passes forwards and downwards from the anterior margin of the oval window, and a small foramen in the outer wall of the vestibule immediately behind the posterior margin of the oval window. So far as I am aware, these structures have not yet been described. In the cadaver, the posterior third of the footplate is rotated inwards, and the anterior two-thirds outwards. This was found in nine out of ten cases examined. The remaining case was particularly interesting, because in it the head and both crura of the stapes had been eroded by caries; hence the stapedius muscle could not exercise any action upon the stapes. It appears probable, therefore, that the stapedius muscle causes a rotation of the stapes round a vertical axis which passes through the footplate at the junction of the middle and posterior thirds. This view is further supported by the fact that the annular ligament is longer at its anterior than at its posterior margin.

Royal Society of Medicine

Meningitic Neuro-Labyrinthitis—Drs J. S. FRASER and J. K. MILNE DICKIE.—*Conclusions*.:—(1) Meningitic neuro-labyrinthitis is a frequent cause of deafness and deaf-mutism. (2) Deafness due to epidemic cerebrospinal meningitis is certainly due to meningitic neuro-labyrinthitis. Measles and pneumonia may also be followed by meningitis and secondary neuro-labyrinthitis. In acquired syphilis and mumps, lepto-meningitis is of common occurrence and is associated with inner ear deafness, which is probably to be explained by neuritis or neuro-labyrinthitis (no microscopic examination as yet). Certain cases of deafness after influenza and osteomyelitis may also be of meningitic origin. (3) The original source of infection may be in the respiratory tract, parotid gland, genital organs, long bones, or elsewhere. (4) A blood infection (septicæmia) probably in all cases forms the connecting link between the primary disease and the onset of meningitis. (5) Meningitic neuro-labyrinthitis is usually but by no means always bilateral. The onset is usually sudden. Irritative symptoms, such as tinnitus, nystagmus, and giddiness, are often present, but may not be observed owing to the mental condition (coma) of the patient. In epidemic cerebrospinal meningitis and parotitis, deafness usually occurs early in the course of the disease. (6) Deafness due to meningitic neuro-labyrinthitis may be associated with other metastatic lesions, *e.g.*, orchitis, arthritis, mastitis, blindness or paralysis of the oculo-motor nerves. (7) The infection usually passes along the subarachnoid space from the base of the brain into the internal auditory meatus and then along the nerves and vessels to the labyrinth. In some cases the perilymphatic aqueduct is the route of invasion, while in others both paths may be involved. (8) As a rule both the cochlear and vestibular apparatus are affected. Frequently the cochlear apparatus is the one mainly or alone involved; rarely do we have a more or less isolated affection of the vestibular apparatus. (9) The pathological changes producing the deafness may be: (*a*) Hydrocephalus; (*b*) changes in the walls of the fourth ventricle; (*c*) purulent infiltration of the eighth nerve with subsequent descending neuritis accompanied by atrophy of the spiral ganglion and Corti organ; (*d*) purulent labyrinthitis which, if the patient lives long enough, is followed by the formation of granulation tissue, and, later, of new connective tissue and bone in the hollow spaces of the labyrinth. (10) The resulting deafness is, as a rule, complete and permanent in the ear (or ears) affected. (11) Vestibular symptoms (loss of balancing and waddling gait) pass off rapidly in adults, but in young children they may last as long as one year. (12) In cases of sudden nerve deafness, with or without vestibular symptoms, lumbar puncture should be performed and the cerebro-spinal fluid examined chemically and microscopically. The Wassermann reaction of the fluid should also be tested and cultures made. (13) Repeated

Societies' Proceedings

lumbar punctures are of use in treatment, especially in cases of deafness due to hydrocephalus. Small doses of potassium iodide and hypodermic injections of pilocarpin have been used in the treatment of meningitic neuro-labyrinthitis, but apparently without success.

DESCRIPTION OF PLATES.

FIG. 1 (Case I.).—Epidemic cerebrospinal meningitis of about eight days' duration. No labyrinthitis. Horizontal section through right ear, No. 135, $\times 6$ diam. 1, External auditory meatus; 2, adhesion between drumhead and inner wall; 3, new bone formation in drumhead (chalk patch); 4, internal meatus, showing slight meningeal exudate; 5, crus commune (note faulty formation of walls of bony canal); 6, convexity of lateral canal; 7, antrum, with thickened lining membrane; 8, facial nerve. Note that long process of incus is absent; it should be situated between the handle of the malleus and the foot-plate of the stapes which is seen in the oval window. Middle-ear suppuration had evidently been present in childhood in this case.

FIG. 2 (Case II.).—Epidemic cerebrospinal meningitis of several weeks' duration. Horizontal section through left ear, No. 130, $\times 9$ diam. 1, periosteal bone; 2, lymph space between above and 3, cartilage bone; 4, endosteal bone; 5, meningitic infiltration within arachnoid sheath in internal meatus. In the basal coil on the right of the illustration in the angle next the internal meatus there is some inflammatory exudate in the scala tympani.

FIG. 3 (Case III.).—Epidemic cerebrospinal meningitis of a few days' duration. Spontaneous nystagmus to the left was observed during life. Horizontal section through right ear, No. 50, $\times 9$ -diam. 1, Facial nerve; 2, crista of lateral canal infiltrated with pus (the exudate is streaming through the apex of the crista, and, if the illustration is turned right round, gives the appearance of a volcano in eruption); 3, aditus; 4, purulent and hemorrhagic exudate in perilymph space; 5, the vestibular nerve surrounded by purulent exudate; 6, purulent and hemorrhagic exudate at point of entry of nerve to utricle.

FIG. 4 (Case III.).—Section 70, $\times 9$ diam. 1, Purulent exudate in helicotrema; 2, exudate in scala vestibuli; 3, same in scala tympani; 4, cochlear nerve with hemorrhagic purulent exudate around; 5, endosteum detached from wall of scala tympani of basil coil (artefact).

FIG. 5 (Case III.).—Section 175, $\times 9$ diam. 1, Pus in scala tympani; 2, thickened membrane of round window; 3, tympanic cavity healthy; 4, ampullary end of posterior canal with exudate in perilymph space; 5, purulent exudate in niche of round window; 6, exudate at cochlear opening of perilymphatic aqueduct.

FIG. 6.—E. B., aged 17 months, measles followed by pneumonia and meningitic labyrinthitis. Section 185, $\times 9$ diam. 1, Purulent exudate in helicotrema; 2, tensor tympani; 3, pus in fundus of internal meatus; 4, purulent exudate in basal coil of cochlea; 5, carotid canal.

FIG. 7.—E. B., pneumonia and meningitic labyrinthitis. Section 185, $\times 38$ diam. 1, Purulent exudate in scala vestibuli—to the left it is lying on upper surface of Reissner's membrane; 2, spiral ganglion infiltrated with pus; 3, scala tympani full of pus; 4, cochlear canal with fibrinous and slightly purulent exudate.

FIG. 8.—E. B., pneumonia and meningitic labyrinthitis. Section 205, $\times 6$ diam. 1, Incus; 2, external meatus; 3, malleus; 4, Eustachian tube, normal; 5, carotid canal; 6, exudate in scala tympani of basal coil; 7, internal meatus (the nerves have unfortunately been torn out); 8, endolymphatic aqueduct; 9, exudate in perilymph space of crus commune; 10, lateral canal; 11, niche of oval window showing thickened mucosa with some exudate.



FIG. 1.



FIG. 2.

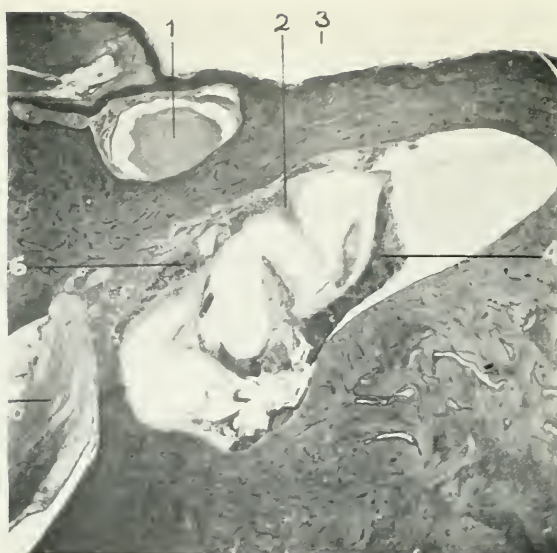


FIG. 3.

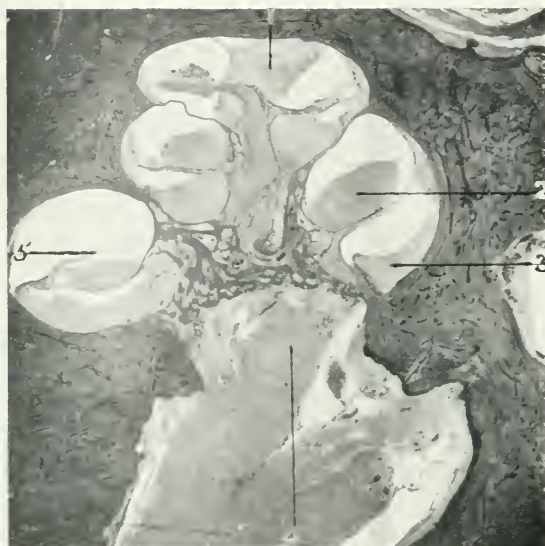


FIG. 4.

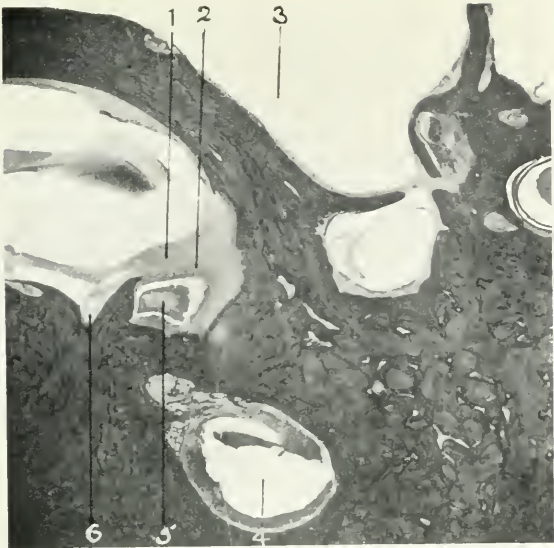


FIG. 5.

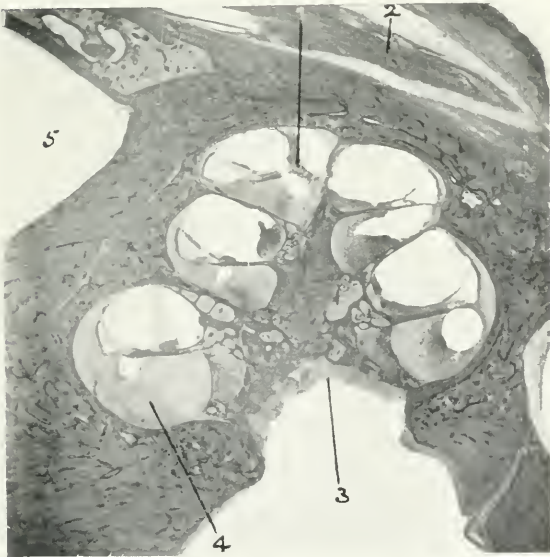


FIG. 6.

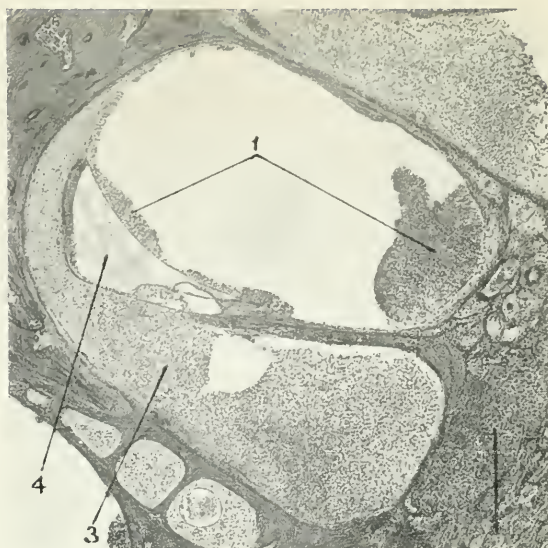


FIG. 7.

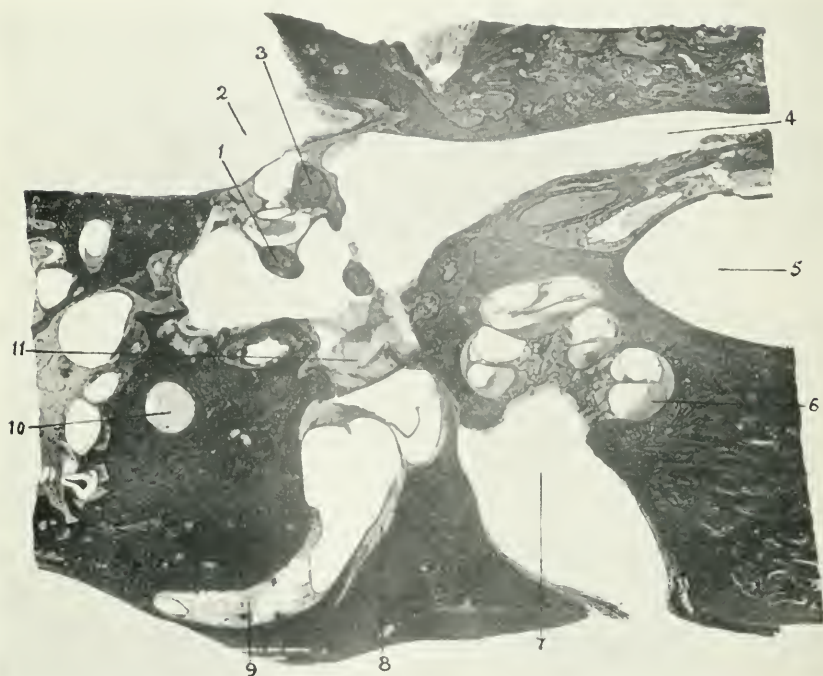


FIG. 8.

Royal Society of Medicine

Sarcoma of Left Middle Ear arising in Eustachian Tube—

Mr RICHARD LAKE.—Male, aged 33. The growth reported on as a spindle-celled sarcoma occupied the whole of the middle ear cleft and in the nasopharynx it was felt as an ill-defined mass involving the mouth of the Eustachian tube. A radical mastoid operation was performed on 6th November 1919, and radium 58 mgr. was buried in the middle ear for twelve hours. There had been no chronic middle ear discharge.

Transplantation of Anterior Half of Masseter Muscle for Facial Paralysis—Mr SOMERVILLE HASTINGS.—Woman, aged 35, had had labyrinthectomy carried out. Three weeks after operation left facial paralysis developed, with some necrosis of bone. The reaction of degeneration was complete. Transplantation operation was performed two and a half years after the labyrinthectomy. A crescentic portion of skin was removed, the left masseter split, the anterior half detached from the jaw, and the lower end of the divided portion stitched with catgut to the tissues of the angle of the mouth. The deformity is reduced and a certain amount of movement of the left angle of the mouth is now possible. The woman has been improved by the operation. She has now much less difficulty with her food. If the temporal muscle is used, it is necessary to bring it over the zygoma, and there must result an unsightly swelling on the face.

Stenosis of the Meatus following Otitis Externa —Mr E. D. D. DAVIS.—Male, with dermatitis for ten years. Stenosis at junction of bony and cartilaginous meatus. Some discharge from middle ear. A conservative mastoid operation was performed and the cartilaginous meatus excised with the exception of a small strip of the anterior wall. A large tube was kept in the meatus and antral cavity for ten days.

Cerebellar Abscess complicated by Thrombosis of the Lateral and Cavernous Sinuses—Mr E. D. D. DAVIS.—Woman, aged 60. C.O.M.S. (right) after measles in childhood. Earache of three weeks' duration, and occipital headache. Coarse lateral nystagmus to right. Weakness of right orbicularis palpebrarum. Marked vertigo on rotation but not on irrigation. Right ear: granulation tissue in the posterior superior quadrant; cholesteatoma; almost complete loss of hearing (right). Operation: antrum deep, contained cholesteatoma with pus under tension. Nystagmus remained, and six days after operation she became unconscious. Opening made through the inner wall of mastoid antrum, but access very limited; bleeding from superior petrosal sinus. Second opening behind the sinus evacuated cerebellar abscess. On eighth day after the second operation, patient had a rigor followed by signs of left cavernous sinus thrombosis. The right cavernous sinus thrombosis

Societies' Proceedings

developed some days later. Both lateral and cavernous sinuses contained suppurating blood clot.

Aspergillus from the Ear—Mr ARTHUR CHEATLE and Mr W. D'ESTE EMERY.—The material was removed from an old operation cavity and was causing pain and discharge. The material was washed in sterile water, and a black nodule was picked out and planted on maltose agar (1 per cent.). I had seven of these cases in private practice in ten months. In one case I was able to prove that the source was the bath water. During the war there had been neglect in cleaning out cisterns.

Columnar-celled Carcinoma arising in Sebaceous Glands or Hair Follicle Ducts—Mr H. J. BANKS-DAVIS.—Man, aged 35, two years ago had a "tumour removed from behind the ear." Intense pain ever since. Tragus red and tender and meatus occluded. Hard swelling over the parotid. Tumour removed along with cartilaginous meatus. Cessation of pain. X-ray treatment.

THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY

NINTH MEETING, ROYAL INFIRMARY, EDINBURGH.

June 14, 1919.

President—Dr WALKER DOWNIE.

Discussion on the Prevention of Chronic Ear Disease was opened by Dr LOGAN TURNER. The following conclusions were arrived at:—

1. That an otologist should be attached to each of the large fever hospitals in Scotland.
2. That the medical examination of school children should include a report upon the state of the hearing.
3. That the nurses attached to the various Child Welfare Centres should receive special instruction in the treatment of middle ear suppuration.
4. That each Educational Authority should organise the treatment of adenoids and tonsils in school children, instead of utilising the voluntary hospitals for that purpose.

Epistaxis due to a Leech in the Nasal Cavity—Dr W. T. GARDINER.—Two soldiers were treated by him in Palestine.

Malignant Disease of the Post-cricoid Area—Dr A. LOGAN TURNER (*Journal of Laryngology*, February 1920).

Amyo-trophic Lateral Sclerosis with Bulbar Involvement—Dr A. LOGAN TURNER.—Woman, aged 46, with impaired mobility

Otological and Laryngological Society

of right half of soft palate and both vocal cords; diminished sensation of pharyngeal mucosa.

Four Cases of Epithelioma of the Larynx—Dr J. S. FRASER.—Three were cases of cancer of one vocal cord, treated by laryngofissure. Recurrence in one case, necessitating laryngectomy. Fourth case, woman aged 60, with extensive epithelioma; laryngectomy; no recurrence two years later.

Acute Infection of Nasal Accessory Sinuses and Middle Ear Cleft on Right Side, associated with Pachymeningitis Interna Hæmorrhagica—Dr J. S. FRASER.—Male, aged 55, with a history of acute frontal sinus inflammation, followed later by severe headache, drowsiness, and occasional vomiting. Removal of the posterior wall of the right frontal sinus exposed an intensely blue dura mater, and on puncture 5 c.c. of blood were withdrawn. Recovery.

Malignant Disease of Middle and External Ear (Right)—Dr J. S. FRASER.—Woman, aged 36. Otorrhœa since childhood. The disease involved the middle ear cleft and the skin of the meatus. Operation followed by radium application.

Epithelioma of External Auditory Meatus (Left)—Dr J. S. FRASER.—Male, aged 45. No history of otorrhœa. When examined, the growth was small, but the patient refused radical measures.

Orbital Complication of Ethmoidal Suppuration and Ethmoidal Mucocele—Dr J. S. FRASER.—1st case: girl, aged 10, with a fistulous opening above the left inner canthus communicating with the ethmoid cells; cured by establishing intra-nasal drainage. 2nd case: female, aged 21: history of injury four years before. Contents of mucocele drained by intra-nasal opening.

Left Recurrent Laryngeal Paralysis—Dr J. D. LITHGOW.—Male, aged 17. Pleural thickening at left apex. When first seen the abductors only were affected.

Note on the Anatomy of the Membranous Labyrinth—Dr J. K. DICKIE.

TENTH MEETING, AT THE WESTERN INFIRMARY,
GLASGOW.

December 18, 1919.

President—Dr W. T. GARDINER.

Stenosis of Trachea following Bullet Wound—Dr R. P. MATHERS.—Male, aged 21. Bullet passed through neck at lower border of thyroid cartilage; tracheotomy necessary: attempted dilatation with T-shaped trachea tube not successful.

Societies' Proceedings

Three Cases of Squamous Epithelioma of Larynx—Dr W. S. SYME.—Male, aged 47. Growth extensive in larynx; laryngectomy in February 1918. Male, aged 69, tumour of anterior part of right vocal cord; thyrotomy, August 1916: no recurrence. Male, aged 72, tumour on anterior part of right cord; thyrotomy, August 1917; no recurrence.

Malignant Mixed Parotid Tumour of Palate—Dr W. S. SYME.—Female, aged 50. An encapsulated tumour involving the soft palate was dissected out. It contained no cartilage. No recurrence.

Carcinoma of Naso-pharynx—Dr W. S. SYME.—Female, aged 20. The patient worked under exposure to fumes of naphtha.

Malignant (?) Growth in Hypo-pharynx—Dr JAMES ADAM.—Female, aged 51. During six years she had been repeatedly treated with radium, cautery, and diathermy, the growth recurring at intervals. The complete duration of the condition was 13 years.

Two Patients with Menière's Symptoms—Dr JAMES ADAM and Dr W. T. GARDINER.—Female, aged 33, and male, aged 30. It was thought that these were cases of toxic neuro-labyrinthitis.

A Series of Cases illustrating the Thesis that Atrophic Rhinitis is the End Stage of a Process commencing with Hyperplasia, and that it is not due to Specific Microbes—Dr JAMES ADAM.—The chief features in the cases were the frequency of associated sinus suppuration and the great thickness of the nasal osseous wall of the antra. Neither the Perez bacillus nor Koch's bacillus was found in any of them.

Electrical Aids to Hearing—Dr J. KERR LOVE.—A series of careful tests made with the Acousticon led to the opinion that it would prove of most value to those who had become partially deaf in adult life from middle ear deafness, and who had not the intricacies of language to deal with as the deaf child had.

Cerebrospinal Rhinorrhœa—Dr J. L. HOWIE.—Female, aged 42. Profuse watery discharge from right nostril preceded by headache and giddiness. Drip continued night and day over considerable periods. No objective evidence of organic or functional nervous disease.

Lupus of Fauces and Pharynx—Dr J. W. LEITCH.—Male, aged 60. Extensive scarring of faucial pillars which were adherent to pharynx. Superficial scarring of right upper arm following a skin affection in childhood.

Pemphigus of the Mouth and Pharynx—Dr A. BROWN-KELLY.—Male, aged 69. Blisters occasionally seen, but more usually

Ear

irregular white patches of membrane and red raw areas; various areas of mucosa became affected. The eyes became affected and the patient is now blind: eyeballs shrivelled: closure of nostrils. Duration five years.

Demonstration of Specimens showing Comparative Anatomy of the Membranous Labyrinth—Dr A. A. GRAY.

Model to Demonstrate Movements of Endolymph in the Semicircular Canals during Rotation Tests—Dr J. D. LITHGOW.

ABSTRACTS

EAR.

The Innervation of the Tensor Veli Palati and Levator Veli Palati Muscles. A. R. RICH. (*Johns Hopkins Hospital Bulletin*, Sept. 1920.)

While studying the physiological relation of the palatal muscles to the Eustachian tube (see abstract in *Journal of Laryngology and Otology* last month), the author discovered in the literature dealing with the nerve supplies of those muscles so great a variety of conflicting opinions that he proceeded to investigate the matter by experiments on dogs.

The tensor veli palati and levator veli palati muscles having been exposed, with their nerve supplies intact, by dissection in the living animal, the various cranial nerves were stimulated within the skull while the naked muscles were observed, and it was determined that:—

1. The fifth nerve is the only cranial nerve which supplies motor fibres to the tensor veli palati muscle. The failure of most clinical observers to detect paralysis of the palate in cases of disease of the fifth nerve arises from the fact that the tensor veli palati exerts, ordinarily, no effect upon the soft palate that can be detected by oral examination.

2. The method of intracranial stimulation, combined with experimental paralysis of the muscle produced by nerve section, places the motor supply of the levator veli palati muscle in the so-called bulbar portion of the eleventh nerve, or rather, in the inferior rootlets of the tenth nerve, since the bulbar portion of the eleventh nerve has been shown to be really an integral part of the vagus.

DOUGLAS GUTHRIE.

Abstracts

Lateral Sinus Thrombosis. CHRISTIAN R. HOLMES and HENRY M. GOODYEAR. (*The Laryngoscope*, 1920, Vol. xxx., p. 1.)

CASE I.—Male, aged 23 years, chronic suppurative otitis media since measles at 5 years. No mastoid tenderness. Anterior perforation, posterior half red and bulging. Myringotomy done. Temperature 103.6. On the fourth day chilly sensation. Temperature 104, with profuse sweat. Leucocytes 25,400; 81 per cent. polymorphonuclears. Blood culture sterile. Radical mastoidectomy; cholesteatoma in antrum; no exposure of sinus. Second day after operation temperature 104.2; severe chill. This recurred several times before further operation was performed. Dura over the temporal lobe was found to be necrotic and perforated. An intradural abscess was drained. Exploration of the sinus was not attempted. The hectic temperature continued. On the fourth day following the operation, patient suddenly developed pain in the left upper abdomen. Autopsy; superficial cerebral abscess, involving the temporal and occipital areas. Double lateral sinus thrombosis which had extended from the left side. The left jugular bulb showed necrosis. Septic infarction of lung. *Streptococcus hæmolyticus* was obtained from all lesions.

CASE II.—Male, 28 years, admitted with cough, pain in chest, and temperature 103°. Drum-head red and bulging; myringotomy. No mastoid tenderness. Two days later temperature 100.4°, tenderness over the antrum. Second myringotomy. Simple mastoidectomy. Perisinus abscess. Sinus was not opened but presented a grey colour. The following afternoon temperature rose to 102°; chilly sensations; sudden onset of delirium; breathing became stertorous and death occurred. Necropsy revealed a fibrino-purulent thrombus of the right lateral sinus. Here again the *streptococcus hæmolyticus* was the infective organism.

CASE III.—Male, aged 23, cough, pain in chest for three days, temperature 104.2°. Bronchial pneumonia. Within seven days temperature normal and lungs rapidly cleared. Eleven days after admission pain in right ear, temperature of 103°; myringotomy. Two days later mastoid tenderness with œdema and sagging. Simple mastoidectomy (*streptococcus hæmolyticus*); sinus covered with granulations. Eleven days later, temperature rose to 104°, with pain in the abdomen. During the next few days temperature rose each afternoon to 103°. Blood culture sterile. Chilly sensations occurred and profuse sweats. Blood culture at last showed hæmolytic *streptococcus*. Jugular ligation and section was done, followed by exenteration of a thrombus from the sinus. On the day following, headache developed. For twelve days the patient kept under morphin. Pulse slow, nausea and vomiting. Seven days after the jugular resection there was evidence of marked engorgement of

Ear

both of the discs. Sight blurred. Later headache ceased. Holmes and Goodyear think that the headache was due to perisinus inflammation, because upon moving the gauge plugs in the region of the jugular bulb excruciating pain occurred in the occipital and temporal region.

CASE IV.—Male, aged 21 years; sore throat. Tonsils inflamed (hæmolytic streptococci). Five days after admission, pain in left ear; myringotomy; temperature 104° . Simple mastoidectomy; perisinus abscess; grey area in the wall of the sinus. Twelve hours later signs of meningeal irritation (restlessness and delirium). Blood culture showed hæmolytic streptococcus. Jugular ligation followed by exposure of the sinus. Thrombosis extended to torcular. During the next two days the temperature rose to 105° and 106° . Metastatic abscesses over right elbow and back of the right hand. Pericarditis developed, followed by bronchial pneumonia and pleural effusion. Recovery.

CASE V.—Male, aged 26 years; acute coryza, and tonsillitis (hæmolytic streptococci); broncho-pneumonia developed with pain in right ear and mastoid tenderness. Myringotomy. Mastoid tenderness continued; temperature rose to 104° . Simple mastoidectomy; sinus normal. Temperature remained 103° . Blood culture showed hæmolytic streptococcus. A severe chill occurred. Second operation revealed perisinus abscess. Internal jugular ligated. The thrombosis did not appear to completely occlude the vessel. Next day severe chill with temperature of 106.6° . The temperature, however, gradually dropped. Uneventful recovery.

J. S. FRASER.

Some Remarks on Cranial Sinus Thrombosis in Children.

S. OPPENHEIMER. (*Archives of Pediatrics*, Jan. 1920.)

The greatest problem of this disease is not the etiology or operative treatment, but the diagnosis.

There are two varieties of thrombosis, the primary or marasmic which occurs in weakly individuals at the extremes of life, and is seldom diagnosed outside of the post-mortem room, and the secondary or infective variety which is most frequently the result of an ear lesion.

The lateral sinus, usually on the right side, is most commonly involved, and males are more susceptible than females.

As regards the relative frequency, about 35 per cent. of all intracranial complications of otitic origin are of the nature of sinus thrombosis.

The writer proceeds to describe the anatomical arrangement of the cerebral veins, and of the temporal bone in early life. The jugular bulb lies close to the tympanic floor, and infection may readily pass through the dehiscences in the bone.

Abstracts

The symptoms are fairly constant, but may be masked by those of the acute infectious disease of which the otitis is a complication. Chief of all symptoms is a sudden and rapid rise of temperature to above 104° , followed by an equally precipitous decline. There is no distinct rigor, but the hands and feet may be cold as the temperature rises.

The temperature, however, is a less reliable guide in the child than in the adult, and may be steadily high rather than remittent. In suspected cases a two-hourly chart should be kept, lest a sudden rise and fall be missed, especially as the general condition of the patient in the intervals may be so good as to throw one off one's guard.

Epistaxis is frequent, and another sign of diagnostic import is the presence of post-mastoidal œdema, the result of blocking of the emissary vein.

A high temperature, continuing for several days after a mastoid operation, demands prompt exploration of the lateral sinus. Too much stress must not be laid upon a negative blood culture. The streptococcus was the infecting organism in each of the author's 150 cases. When suggestive symptoms were present after a mastoid operation at which the pneumococcus was found to be the infecting agent, sinus thrombosis was never found, but some other complication, such as pneumonia, accounted for the fever.

Prognosis depends upon the stage at which the disease has been recognised. The earlier the operation, the lower the mortality. When the torcular or bulb has been involved, or metastases have appeared, the outlook is very grave.

To secure good results, the pediatrician must co-operate with the otologist in establishing an early diagnosis. DOUGLAS GUTHRIE.

Cerebellar Abscess. CLARENCE KEELER. (*The Laryngoscope*, 1920, Vol. xxx., p. 143.)

Male, aged 35, in childhood had measles complicated by purulent otitis media (right). The discharge has been constant since 1914 and accompanied by dizziness. In April 1919 there was paralysis of the muscles of the right eye, the right side of the face and tongue, and of the right leg. Upon admission, temperature $97-98$. The paralysis had disappeared but he was suffering from severe occipital headache, projectile vomiting, and had a peculiar enunciation. Some atrophy of the right leg. Knee-jerk more marked on the right side. Disc margins slightly blurred. X-ray shows the mastoid sclerotic with a bone defect in the antral region communicating with the meatus. The right labyrinth and the eighth nerve were functionally dead. Spontaneous nystagmus to right, left, up and down. Spontaneous past-pointing 3 inches to the right and 2 inches high. He falls backward and

Ear

to the right. Stimulation of the horizontal semicircular canals by rotation showed he was unable to past-point inward with his right and left arm, indicating involvement of the inward pointing centres of the right and left arms in the corresponding cerebellar hemispheres (left centre involved by pressure). *Operation*—Radical mastoid with evacuation of a cerebellar abscess. The labyrinth appeared in the wound as a sequestrum. The lateral sinus had become obliterated. Recovery.

J. S. FRASER.

The Surgical Treatment of Brain Abscess. A. W. ADSON (Mayo Clinic). (*Journ. Amer. Med. Assoc.*, 21st August 1920.)

This paper is a study of 26 cases of brain abscess occurring in the Mayo Clinic in the last five years. The diagnosis was verified by operation or post-mortem in 23 cases. Of 17 non-surgical cases 7 died during the period of observation, and 7 had previous operations for lung abscess, bronchiectasis, etc. Two of these recovered. Nine cases were operated on, and of these 5 recovered while 4 died soon after the operation.

With regard to the causes, 5 were due to otitis media, 6 to frontal sinusitis, 2 to frontal sinusitis with osteomyelitis, 4 to injury to the skull, 5 to chronic empyema, and 4 to septic lung conditions. As regards situation 14 were located in the frontal lobes, 4 in the temporal, 2 in the temporo-sphenoidal, 1 in the occipital lobe, 2 in the cerebellum, 1 in the mid brain, 1 under the temporal lobe, and 1 on the cortex accompanied by encephalitis. The leucocyte count for the whole series averaged 16,000. Examination of the cerebro-spinal fluid showed a normal cell count of 2 to 5 lymphocytes to a cubic millimeter, except when the case was complicated by meningitis or encephalitis. Choked optic discs were present in 9 cases. Local tenderness was present in 12 cases, in 4 of which it was not over the abscess, while in 8 it was a confirmatory symptom. Partial or complete paralysis of one or more nerves was present in 14. Fifteen were mentally affected. Duration of symptoms varied from three days to three years. Judging by the results of these 26 cases the prognosis is most favourable when the symptoms have lasted about six months. The abscess at this stage is generally well encapsulated. "During the initial stage the process is more likely to be encephalitis or meningitis than cell destruction and pus formation; therefore very little can be accomplished by surgical intervention, as the encephalitis frequently continues and produces death." Similarly, in the terminal stage meningitis or encephalitis are generally present and the condition is practically hopeless. Operation in the middle or quiescent stage is recommended, if at all possible.

J. K. MILNE DICKIE.

Abstracts

Treatment of Brain Abscess. SHARPE. (*The Laryngoscope*, 1920, Vol. xxx., p. 376.)

Sharpe holds that if we are absolutely certain that the abscess formation lies directly beneath the affected dura, and that this area of the dura is adherent to the underlying cerebral cortex, then the ideal method of operative drainage is naturally through the site of original infection. In a large percentage of patients, however, the local operation does not disclose any definite signs of a subdural lesion, and the dura is not adherent to the underlying cerebral cortex. In such cases it is distinctly dangerous to open or to puncture the dura and to explore in the hope that the abscess can be successfully drained. In these patients exploration of the temporo-sphenoidal lobe should be made through the "clean" subtemporal route as in the operation of subtemporal decompression and drainage. The vertical incision should be used. If the abscess is not found, then the exploration has been performed with little or no danger of meningitis or encephalitis. As an efficient means of drainage, Sharpe recommends the double glass tubes, one tube within the other, so that the outer tube always remains in place in the abscess cavity while the inner tube can be removed and used as a means of suction-drainage. Sharpe advises a similar procedure in the case of cerebellar abscess. The mortality of brain abscess is high; without operation practically 100 per cent., and with operation, 60 per cent. and even higher. The diagnosis and accurate localisation are most difficult, and for these reasons the operation of drainage must almost always be considered as an exploratory procedure.

J. S. FRASER.

In What Position should a Patient with Brain Abscess be placed after Operation? O. MUCK. (*Z. f. Ohrenheilk*, Bd. 79, H. 1-2, 1920.)

Muck, as the result of numerous observations, concludes that the position of the head is of great importance in the after-treatment of brain abscess cases. If the patient is in the half-sitting position turning the head to one side will cause the brain wound to close, while turning it in the other direction causes the wound to gape. The author explains this by interference with the venous return from one side of the brain through twisting the neck. He cites a case in which a large amount of pus was expelled from the cavity by turning the head first to one side and then to the other during the dressing. If the case is being treated with tube drains it is recommended that he be kept with his head high, at any rate for some hours daily, and that his head be turned gently to one side and then to the other. When the patient is lying down with the head low turning the head has no effect on the brain wound.

J. K. MILNE DICKIE.

Pharynx

Experimental Observations on the Treatment of Brain Abscess. JOHN M'COY. (*The Laryngoscope*, 1920, Vol. xxx., p. 75.)

The methods employed at present for the protection of the meninges are mainly two: (1) MacEwen's, *i.e.*, packing a layer of gauze all around the margins of the dural exposure, between the bone and the dura; (2) the cofferdam dressing; the dura is incised and iodoform gauze packed beneath the dural flaps. M'Coy experimented on dogs. Thus far, subdural injections of paraffin appear to give a better type of adhesion than gauze pressure because more accurate. Such injections do not seem to produce cerebral irritation. M'Coy proposes to continue the experiments.

J. S. FRASER.

Temporo-Sphenoidal Abscess. JOHN LESHURE. (*The Laryngoscope*, 1920, Vol. xxx., p. 80.)

Male, aged 21, chronic suppurative otitis media (right). For six months frontal and occipital headache. Examination revealed polypus and foul discharge. Middle ear deafness. Rotation nystagmus normal, and eye grounds normal. Polypus removed. Five weeks later headache returned. Radical operation: no necrosis of tegmen. Temperature between 99° and 100° F. until the ninth day, when it rose to 102°. Pulse from 80 to 90. Patient stuporous. Kernig and Babinski signs present. Optic neuritis on right side. Clear fluid on lumbar puncture. Immediately after lumbar puncture the patient ceased to breathe, although the pulse continued good. Artificial respiration was kept up for nearly three hours. Incision of the right temporo-sphenoidal lobe evacuated about 30 c.c. of greenish pus mixed with cerebro-spinal fluid. As the patient's heart had now ceased, digital exploration revealed the fact that the abscess had ruptured into the right lateral ventricle. Autopsy was not permitted. Leshure states that the persistent headache should have aroused suspicion of deep-seated trouble. Further, there was slight facial paralysis of the same side. The patient was constantly attempting to brush away from his face some fancied source of irritation, and stated that he frequently felt as though he were "in a dream." Leshure wishes to emphasise the danger of doing a lumbar puncture before evacuating the brain abscess.

J. S. FRASER.

PHARYNX.

Mixed Tumours of the Throat, Mouth, and Face. G. B. NEW. (*Journ. Amer. Med. Assoc.*, 11th September 1920, p. 732.)

The author has reviewed 68 cases of mixed tumours occurring at the Mayo Clinic from 1912-18.

The situations of the tumours were:—Larynx, 1; pharynx, 4;

Abstracts

palate, 3; upper lip, 3; sublingual region, 1; cheek, 1; submaxillary region, 5; parotid, 50—total, 68.

The patients usually attended for recent increase in size of the tumour. Thirty-three of the tumours had been present for more than five years, and the others for periods varying from ten years to forty years. Thirty-three males and 35 females were affected.

The tumour presents a hard nodular surface with the feel of a malignant growth, and such tumours in the pharynx are usually located laterally bulging the posterior pharyngeal wall and the palate.

Owing to the slow growth of the tumours the patients become accustomed to the gradual diminution of the air and swallowing space and do not complain of dyspnœa or dysphagia. Tracheotomy was required in 1 case only. The glands are rarely involved, but occasionally a mixed tumour becomes sarcomatous and is very malignant in type.

The etiology of mixed tumours is obscure. Some observers classify them as endotheliomata, others believe they arise from the glandular structure of the salivary glands or develop from embryonic tissue. Grossly they present a definite capsule, are smooth, lobulated, and easily shelled out by enucleation. The slowly-growing tumours are hard, while the rapidly-growing ones are soft. Microscopically they consist of connective tissue, epithelium in the form of tubules and cartilage. The percentage of recurrence following complete removal is very small. This paper is also extensively illustrated.

E. D. D. DAVIS.

The Effect of Tonsillectomy on the Recurrence of Acute Rheumatic Fever and Chorea. W. S. LAWRENCE. (*Journ. Amer. Med. Assoc.*, 16th October 1920.)

This investigation deals with 85 children, each of whom had presented some rheumatic manifestation prior to operation. The tonsils were the seat of recurrent inflammation in 73 per cent. of those children, and were enlarged in 82 per cent. In all cases the cervical lymphatic glands were enlarged, and after operation were palpable in only 59 per cent.

One or more attacks of acute rheumatic fever had occurred in 42 cases, before removal of the tonsils. After operation there was no recurrence in 35 cases (84 per cent.). Patients who suffered from chorea (40 in number) had no recurrence in 50 per cent. of cases, while 77 per cent. of those who showed myositis or joint pains prior to operation had no return of the trouble. All the children were carefully observed for over three years, so as to ensure accuracy of results. Nutrition and general health improved and infections were less common after the tonsils had been removed.

DOUGLAS GUTHRIE.

Peroral Endoscopy

Tonsillectomy under Local Anæsthesia. CULLOM. (*The Laryngoscope*, 1920, Vol. xxx., p. 419.)

Cullom states that though the great majority of patients complain of absolutely no pain, a few complain of varying degrees of pain. Two pairs of forceps are locked—one on each tonsil. With a few quick strokes of the knife, the left tonsil is freed from its attachments, especial care being used to free the supratonsillar region, as it is essential that the snare should get well behind the superior pole. The left tonsil being freed, the right tonsil is quickly freed in like manner. The assistant now hands the surgeon a snare, and at one stroke he removes the right tonsil. While the surgeon is removing the right tonsil the assistant slips the loop of the other snare over the forceps attached to the left tonsil. Practically all patients think that they have had only one tonsil removed. Most cases of delayed bleeding are cases that have never stopped bleeding. There are, however, patients with a delayed coagulation time. If pressure by forceps and the skin clip fail, the author's tonsil clamp is applied, and left in position for an hour. Cullom has operated on many patients over sixty and a number over seventy, and has eliminated mere age as a contra-indication to operation. In the great majority of cases the bleeding has been from the tonsillar branch of the facial artery, which may pierce the capsule at any point. The spurting from this vessel is nearly always upward. Cullom's cases of secondary bleeding have all come on the fifth day. In twenty-four years he has had six cases.

The article is illustrated.

J. S. FRASER.

PERORAL ENDOSCOPY

The Physical Signs of Foreign Bodies in the Bronchi. THOMAS M'CRAE. (*Amer. Journ. of Med. Sciences*, March 1920.)

The writer has had exceptional opportunities for studying such cases, having been accustomed to work in conjunction with Dr Chevalier Jackson. He believes that the occurrence of foreign bodies in the lung is much more frequent than is generally supposed. This is shown by the fact that of late years the number of cases occurring in Philadelphia alone has shown a remarkable increase. The explanation of this fact is that the medical men in Philadelphia are now on the lookout for such cases and refer them promptly for extraction. The clinical features vary enormously. Small metallic bodies which do not obstruct the air passages give rise to very few symptoms. Peanuts and certain other vegetable materials on the other hand cause a marked inflammatory reaction, leading rapidly to a fatal issue. One sign only is constantly present, namely, decreased expansion of

Abstracts

the affected side of the chest. When secondary changes have occurred in the lung from plugging of one of the bronchi a localised area of dullness may be detected. Certain cases also give a sign designated by Jackson as the "asthmatoïd wheeze." This may be heard by listening at the patient's open mouth and may sometimes be elicited only at the end of forced expiration. As regards diagnosis, a negative history is of no value since people occasionally inspire foreign bodies without noticing the occurrence. A positive history, on the other hand, should never be disregarded, and the possibility of a foreign body in the lung should be kept in mind in all cases of chronic pulmonary infection of obscure origin.

J. K. MILNE DICKIE.

Œsophageal Obstruction in Young Children. H. T. ASHBY. (*The British Journal of Children's Diseases*, Nos. 202-204, Vol. xvii., October to December 1920).

Ashby records five cases of lower œsophageal obstruction. The symptoms started and were progressive from the time when solid food was given. Liquids were well retained. The site of stricture in these cases is found to be about one inch above the stomach. In forming the diagnosis the X-rays and bismuth were conclusive. One illustrative case is fully cited.

Pathologically the author considers the affection to be spasmodic in origin, the original spasm being succeeded by an actual fibrotic hypertrophy. He believes that it has a close analogy to hypertrophic stenosis of the pylorus.

The treatment adopted consisted in giving liquid food at times when the spasm was severe. Bougies were of necessity passed every two or three weeks with or without anæsthesia. In a typical case Ashby would in future do an early gastrostomy and so give the hypersensitive strictured area of the gullet a thorough physiological rest.

JAMES B. HORGAN.

REVIEWS OF BOOKS

Text-Book of Tracheo-Bronchoscopy. By Dr M. MANN, Dresden.
Translated by A. R. MOODIE, M.D. (John Bale, Sons, & Danielsson, London, 1920.)

THE art of endoscopic examination of the air and food passages will take a larger share in the scientific medicine of the future than it has done in the past. The book under review adds not a little to our information on the subject, and brings the searchlight of knowledge acquired through the channels of patient observation and carefully thought-out facts to illuminate this field.

As a literary effort, the book has no claim to distinction, and many of the sentences might well be recast in the translation: the second half of the book which deals with pathological conditions is badly arranged and the reading is dull. The illustrations are good and often make the description of the instruments or technique unnecessary.

After a short chapter on Anatomy there is an important section on History and Instruments which is well worth perusal, and it is probably owing only to the accident of circumstances that no reference is made to the excellent instruments designed by Irwin Moore and the other English operators. Preference is naturally given to the instruments with proximal illumination, and the various and somewhat fragile operating instruments designed by the Killian school.

Mann prefers local anæsthesia and the vertical position for his examinations, and one cannot escape the conclusion that the German subject is more tolerant of this method than the English one will ever be. The technique of local anæsthesia is well given, and he emphasises the fact that complete abolition of sensation and reflexes in the larynx is the alpha and omega of bronchoscopy. He employs a 20 per cent. solution of cocaine to which a few drops of adrenalin have been added and paints the fauces and larynx with a hair brush, which he says absorbs less cocaine and retains less of the drug unused, but he draws attention to the increased danger of using cocaine in a spray. For the trachea and bronchi he employs the flexible syringe of Ephraim and a 1 per cent. solution of quinine urea to which adrenalin (1:10) is added. He greatly prefers local anæsthesia for tracheotomy, and in this we entirely agree.

The paragraph on general anæsthesia is poor and might well be elaborated. No reference is made to the newer methods of narcosis suitable for this operative field, and apparently the use of atropine has not been adopted by the bronchoscopists of Germany. Mann even condemns its use, with which conclusion we do not agree.

Careful attention is given to the respective indications for upper and lower bronchoscopy. "Never the upper for vanity—never the

Reviews of Books

lower for indolence" is a motto which might be remembered. The following indications are given for lower bronchoscopy (Kahler): (1) For severe strictures or in the presence of insurmountable obstacles, anatomical abnormality, or great irritability; (2) all acute cases in which upper bronchoscopy is not successful in ten minutes; and (3) (Mann) for children or adults if for any reason the general condition is bad; and lastly (4) for the extraction of soft foreign bodies which tend to swell or break up. He concludes this section by the remark that "the man who is not the master of upper bronchoscopy will no doubt accomplish his aim more easily by the lower method."

The second part of the work treats in the first place with the examination and removal of foreign bodies. The subsequent chapters deal with diseases of the bronchial system and surrounding organs, and contain much new work and give valuable indications for the scope of this art in the future.

Indications for endoscopic treatment are given, of which the following examples may be cited. In diphtheria when tracheotomy fails to give relief from asphyxia a tube has been passed through the tracheotomy wound and a membranous cast of the bronchial tree has been removed—a process which may save life. In asthma, again, the process is one which is said to occur primarily in the fine bronchioles beyond the reach of the eye, and good results are claimed from a spray of novocaine 2 per cent. and adrenalin (1 : 1000) 10 per cent. in water applied to the deeper parts of the bronchial tree.

Lastly, we think the best feature of the book to be contained in the excellent bibliography which forms a very useful reference to the work of Continental and to a less extent American operators, and we can only regret that a record of the work of English bronchoscopists is conspicuous by its absence.

E. MUSGRAVE WOODMAN.

Diseases of the Ear. P. D. KERRISON. Second Edition.
(J. B. Lippincott Company, Philadelphia and London.)

The addition of two entirely new chapters constitutes the essential change in this edition. Of these two, Chapter XIV., p. 394, dealing with Bárány's theory of cerebellar centres, is the more valuable. There is very little doubt that an explanation of this theory will necessarily be included in all future text-books of Otology. According to Bárány, the cerebellar cortex is subdivided into four main centres, each controlling tonus in one direction. Should, for instance, the centre for inward tonus be destroyed in the left cerebellar hemisphere, this will result in an outward deviation of the left arm when the pointing test is made. The deviation occurs also in all the other joints on the corresponding side of the body. The evidence for the localisation of these centres is on the whole convincing. No

Reviews of Books

opportunities for testing it should be missed. This section of the book is complete in itself, and one regrets that the author has condensed the matter into five pages when amplification would have been welcome.

The Chapter on War Deafness (XXI.) is on the whole uninteresting. The anatomical section is excellent. For clearness we recommend p. 22, where the mechanism of the malleo-incudal joint is discussed. The mucous lining of the middle ear cavities is described as squamous in the vault (attic), aditus, and antrum. The author presumably means endothelial. These histological features are not discussed in relation to the pathology of chronic suppurative conditions or cholesteatoma formation, a fruitful field for research and speculation.

In connection with hearing tests, Dr Kerrison mentions an electrically driven tone range audiometer, capable of producing musical tones from 30 to 10,000 double vibrations, an ideal but probably unattainable instrument. It seems a better means of detecting "islands of hearing" than Bezold's outfit (p. 86) of "ten large forks with clamps, four smaller unclamped, two organ pipes, and Galton's whistle."

The coloured plates in illustration of Chapter IV. add greatly to the value of the book. Plate VI., *e.g.*, is worth pages of description of herpes zoster oticus.

In Shambaugh's hypothesis (p. 276) we recognise some of the features of the theory of hearing recently advanced by Sir Thomas Wrightson and Arthur Keith. Stress is laid on the analogy between the vestibular and cochlear parts of the membranous labyrinth, both otolith membrane and membrana tectoria conveying their own vibrations to the underlying hair cells, these being interpreted as changes in position in space or sound respectively.

The chapter on the surgery of the lateral sinus and cerebral abscess calls for brief comment. The routine resection of the whole internal jugular vein advocated by American surgeons (and the present writer is no exception) has always seemed very drastic to us. Contrast with this the almost timid treatment of cerebral abscess. The dangers of spreading infection, of cerebral hernia, are constantly kept in mind; vertical incisions alone into the dura are allowed, and the brain is explored in one direction only. Should a dural fistula be discovered, this must be left as rigidly alone as one on the external semicircular canal. Drainage is left almost entirely to intra-cranial pressure, the dural incision alone being kept open by gauze wicks.

This book will not appeal to those who are seeking the stimulus of original speculation. But it forms a thoroughly reliable and up-to-date guide to the orthodox teaching of otology, with the added merit that the writer on the whole avoids wearisome and unnecessary details of the niceties of treatment.

J. KEEN.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W.

Section of Laryngology (President, Dr W. Jobson Horne).—The Annual Meeting of the Section will be held on Friday, 6th May, at 4 P.M. Members intending to show cases or specimens should send in their notes a fortnight before that date to the Hon. Secretaries, C. W. M. Hope, 22 Queen Anne Street, W. 1, or W. G. Howarth, 75 Harley Street, London, W. 1.

The Summer Meeting of the Section will be held on 2nd, 3rd, and 4th June. The following is the Programme of the Meeting:—

Thursday, 2nd June, 2.30 to 5.30 p.m.

- (1) Mr Mark Hovell: The Indications for and against Complete Tonsillectomy. (Methods and instruments not to be discussed by Members.)
- (2) Mr W. G. Howarth: Operations on the Frontal Sinus.
- (3) Sir St Clair Thomson: The Usual Site of Origin of Intrinsic Cancer of the Larynx, as demonstrated by forty-eight Laryngo-fissures.
- (4) Mr Aikin: The Science of Phonology.
- (5) Mr E. D. D. Davis with Mr Warwick James: The Cause and Effects of Mouth Breathing.

Friday, 3rd June, 10.30 to 1 o'clock.

- (1) Sir William Milligan: Diathermy in Inoperable Pharyngeal and Epi-Laryngeal Malignancy: its Objectives and Limitations, with a Review of Cases.
- (2) Dr Irwin Moore: Eversion of the Sacculus Laryngis, the so-called Prolapse of the Ventricle.
- (3) Professor Hobday: Observations on the Results of over 2000 Cases of Vocal Cord Paralysis in Horses treated by the stripping of Morgagni's Ventricle.
- (4) Dr A. Logan Turner: Paralysis of the Vocal Cords in Cases of Malignant Tumour of the Mamma.
- (5) Mr W. S. Syme: Bronchoscopy in the Treatment of Asthma.

General Notes

(6) Mr A. R. Friel :

(a) X-ray Examination of the Ethmoidal Labyrinth.

(b) The Reduction or Removal of Tonsils by Zinc Electrolysis.

(7) Mr Franklin : Defective Development of the Naso-frontal region, illustrated by the Case of a Living Male Infant with a Lateral Proboscis.

(a) Reference to Ancient and Modern Interpretations of the more Extreme Types of these Deformities, particularly Cyclops Rhinencephalus.

(b) Description of the Present Case and its Relation to Cyclopia.

2.30 to 4 o'clock, *Demonstrations.*

(1) Dr Reginald Morton : Some recent Developments in X-ray Treatment for Laryngeal Cases.

(2) Dr Mullally : The Technique of Blood Transfusion.

(3) Mr T. B. Layton : Demonstration of a few of Professor Onodi's specimens.

4 o'clock.

The Ordinary Meeting of the Section.

Saturday, 4th June, 10 to 1 o'clock.

The Staff of University College Hospital, of the Central London Ear and Throat Hospital, and Surgeons at other Hospitals, will perform special operations.

A Dinner will be held at the Trocadero Restaurant on *Friday evening, 3rd June* (hour 7.30 for 8 o'clock).

Section of Otology (President, Sir Charles Ballance).—The Annual Meeting of the Section will be held on 20th May at 5 P.M. Members intending to show patients and specimens should send notes of the same to the Senior Hon. Secretary, Mr Lionel Colledge, 22 Queen Anne Street, W. 1, at least twelve days before the Meeting. Papers must be sent in at least twenty-one days in advance, complete and ready for printing, in order that they may be previously examined and approved by the Council.

Société Française d'Oto-Rhino-Laryngologie.—The Annual Meeting will be held in Paris from the 9th to the 12th May at the Hôtel des Sociétés Savantes, 8 Rue Danton, under the Presidency of Professor Mouret of Montpellier. The subject for general discussion will be : "Complications orbito-oculaires des Sinusites," to be introduced by Dr Lemaitre. The General Secretary is Dr Robert Foy, 28 Rue La Trémoille VIII^e, to whom all communications should be addressed.

General Notes

The Annual Meeting of the American Medical Association will be held in Boston, Mass., from 6th to 10th June. Dr William B. Chamberlin, 1020 Huron Road, Cleveland, Ohio, the Secretary of the Section of Laryngology and Otology, will be pleased to give any information regarding the meeting to laryngologists and otologists in this country who may be arranging to visit the United States early in June.

The American Laryngological Association will hold its Annual Meeting in Atlantic City on 30th May.

The American Laryngological, Rhinological, and Otological Society will hold its Annual Meeting in Atlantic City on 1st and 2nd June.

The Thirteenth Meeting of the Scottish Otological and Laryngological Society will be held in the Royal Infirmary, Edinburgh, on Saturday, 11th June.

A combined Meeting of members of the American Otological Society and members of the Section of Otology of the Royal Society of Medicine will take place in London on 14th, 15th, and 16th July. Further details will be published later.

The British Medical Association will hold its Annual Meeting at Newcastle-on-Tyne on 19th, 20th, and 21st July. The Hon. Secretaries of the Section of Oto-Rhino-Laryngology are Lionel Colledge, F.R.C.S., 22 Queen Anne Street, London, W. 1, and W. Frank Wilson, M.B., M.S., 97 Jesmond Road, Newcastle-on-Tyne.

There will be an International Conference on Tuberculosis in London on 26th, 27th, and 28th July, under the Chairmanship of Sir Robert Philip, Professor of Tuberculosis in the University of Edinburgh.

We congratulate Dr Dan M'Kenzie upon his election as a Corresponding Fellow of the American Laryngological Association.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

SOME DISCARDED THEORIES AND METHODS.

By P. McBRIDE, M.D., F.R.C.P.E., F.R.S.E.

MANY of those who have passed a number of years in intimate association with scientific medicine and surgery must have pondered over the theories and methods which they have seen spring up only to die more or less inglorious deaths. The line of thought so begun will, if followed, give rise to many interesting questions. Thus one is led to wonder how it comes about that the protagonists of the novel are often able to quote results and so raise hopes which future experience shows to be baseless. General consideration of the matter seems to lead us to the conclusion that the more obscure the subject the greater the chance that the theorist will step in; and this is what we have a right to expect, for if we have not exact knowledge we endeavour to find a working hypothesis—in other words, we theorise. This is a perfectly legitimate proceeding, but, when we adopt it, we must restrain ourselves and refuse to allow imagination to run riot. Our theories must be built upon the objective and demonstrable rather than upon the subjective pure and simple. Thus, we shall be safe if we work from definite anatomical, physiological, or pathological facts, but unsafe if we utilise unproved speculations as links in the chain of our logical inferences.

On reflection, it will occur to us that in surgery there have been few theories advanced which future experience has made it necessary to discard altogether, while in the field of medicine there have been many. If we seek an explanation, it will be found in the fact that the former is a science which can be

P. McBride

checked by objective demonstration, while the latter is often a matter of either working altogether in the dark, or, at least, in relative obscurity. As a general proposition it may be asserted that in medicine the less we know of a disease, the more has it been a subject for theory. This is, of course, perfectly natural and just as we should anticipate. Then we have also the curious but still natural fact that the more incurable a disease, the more methods of cure have been paraded and in some cases vouched for as efficient.

It is not for us here to enter into controversial points on general medicine, but we may perhaps be permitted to refer to the enthusiasm shown throughout the civilised world about the results obtained by means of tuberculin on its first introduction. It is now admitted that the then method of utilising it was unsafe, that it did not do much good, and that it often caused harm. Yet eminent men vied with each other in laudation and in publishing reported cures. Psychologists now realise that in times of excitement crowds tend to be swayed, not by common sense and logic but by impulse. It is interesting to speculate how far a similar tendency may account for the support occasionally given to sensational statements by men whose reputations have seemed to rest on substantial grounds. It is quite easy to picture the medical world carried away by a great wave of emotion as it seemed to be over the tuberculin question, and losing its mental balance as it undoubtedly did.

It is perhaps not quite so simple to apply this explanation to the same sort of thing on a much smaller scale, but possibly we should be right in doing so, although obviously the number of persons specially interested would be much smaller. Thus let us suppose that somebody announces a cure for progressive deafness, and we immediately have a circle formed which includes the originator, the friends of deaf people and the deaf themselves. All wish the method to succeed, suggest to themselves and to the others that it will succeed, and many of them, in spite of evidence to the contrary, will go on believing that it has succeeded. These last will go about singing the praises of the man or method, and so the circle will increase in spite of the falling away of those who have still retained their critical faculties.

Much the same kind of thing may result when the lay press takes up the question of the cure of some common

Some Discarded Theories and Methods

ailment, such as adenoids, without operation. As readers know, there has recently been a long correspondence in the *British Medical Journal* in which many of our confrères painted the position of adenoid out-cases in our hospitals in what we may perhaps be pardoned for calling rather lurid colours. The object was praiseworthy, for they desired to make the conditions safer and better. It so happened, however, that this more or less coincided with suggestions for non-operative treatment which were referred to at length in a popular weekly journal, the editor of which demanded that Government should give facilities for the investigation of the new methods. Curiously enough this editor writes in the most sensible and sceptical way of alleged spiritualistic phenomena, but seems quite incapable of applying the same kind of critical acumen to medical methods. Thus in the case of the former he refuses to accept evidence which proceeds from people who are obviously incapable of investigating phenomena and of detecting fallacies, or who are personally interested in the success of the exhibition. In the latter, on the other hand, he seems to prefer the testimony of those who are least capable of arriving at a correct view, or whose interest it is to think otherwise. In fact he appeals from the admitted experts to the lay public, the while he attempts to discredit the former. It requires no scientific psychologist to prove that such a method is not likely to elucidate truth. This matter has been referred to because it shows how not only the emotional but also those who may be presumed to have some knowledge as to scientific evidence can be swayed when their feelings are allowed to play havoc with common sense.

Readers of this Journal are well aware that it is highly improbable that adenoids can be made to disappear by non-operative methods, to which we shall again refer in this paper; that in many cases it may be fraught with very serious consequences to delay interference, and that the promulgation in the popular press of the idea that surgery is not required will often lead to such delay. The chain of events will again be the same—adenoids have in a few cases, possibly coincidentally with the application of some form of treatment, diminished sufficiently to appear for the time cured; a surgeon had advised operation (for no one claims infallibility for all surgeons) and the nucleus of the crowd is formed. There are many children who ought to be operated upon. Parents dislike operations; they

hear of cases cured without it and resolve to give the patients the chance. They do not know the risks involved in waiting, and owing to their emotions are not capable of judgment, nor will they always be convinced by the reasoning of the expert. They have heard through the press, or otherwise, of a successful case, therefore all cases must be successful—so at least they persuade themselves. There is another curious mental factor at work in such instances. The very fact of desiring a cure leads very readily to the belief that it has actually taken place because, perhaps unconsciously, there is a tendency to marshal all the favourable points and to ignore those which are adverse.

We have thus seen that the phenomena of crowd psychology may on occasion involve large numbers of our profession, as instanced in the first Tuberculin enthusiasm. We have endeavoured to show how these same phenomena may occur in smaller groups of people—sometimes in association with one or two doctors, or more commonly with some irregular practitioner. In crowd psychology, logic and reason tend to give place to blind faith. If facts can be collected to support the position, they are exaggerated; if there be no facts they are invented, and everything bearing on the question of the moment is regarded with distorted and prejudiced judgment.

At this stage we may perhaps attempt to suggest some points which should be investigated when a new theory or method is put before us. In the first place it will be necessary to consider the position and qualifications of the originator. If his scientific reputation be good, it will incline us to look with favour upon his suggestions. It must, however, be admitted that too much importance need not be attached to a name, and that we must not reject a proposal merely on such grounds. The really important thing will be the evidence adduced. This must be weighed with the greatest care, and moreover—as most of us have seen in countless cases—we must remember that the original author of a method is of necessity, though often quite unconsciously, a biassed witness. Then it often happens that we must ask ourselves whether the facts produced are in accordance with probability. Do they rest upon a sound basis of anatomy, physiology, or pathology, or are they, as judged by this standard, inherently improbable? Sometimes an able writer who is at the same time a clever dialectician may carry away his readers by making some scientific assumption which he uses as an argument, but which

Some Discarded Theories and Methods

subsequent investigation may prove not to have been justifiable. Then again we know how clinical results tend to be regarded favourably by those who desire to compile good statistics.

Let us now turn our attention to Laryngology, Rhinology, and Otology, and consider some of the discarded theories and methods of which readers of this Journal have special knowledge. It is evident that from the time of the invention of the laryngoscope, the pharynx and larynx have been open to objective examination and, with regard to them—if we except discussions on innervation—there has been little or no theorising. Moreover, such new methods as have been suggested have generally been of value. Rhinology, on the other hand, has supplied us with a fair number of instances. Thus older readers will recall the very great importance at one time attached to the nose as a cause of reflex neuroses. That various nervous affections were occasionally benefited and even sometimes cured by cauterising the nasal mucosa we all know, but if we look back upon the large literature which was at one time produced on this subject, we will be driven to admit that the only point of far-reaching importance which has remained with us is the establishment of the connection between the nasal mucosa and certain cases of asthma—a connection which had been established by observations prior to the introduction of the general question of reflex neuroses by its chief protagonist. In writing this we do not forget that sometimes neuralgia is favourably influenced by nasal cauterisation.

Ozæna being an ailment difficult if not impossible to cure absolutely, has given rise to many theories, suggestions, and experiments. Thus it has been cleverly argued that the affection is always the result of diseased accessory cavities, but it must be admitted that this view never had many adherents. It is interesting to speculate how its originators were able to convince themselves of its accuracy, as neither clinical examination nor results would seem likely to substantiate the connection in any but exceptional instances. As usual in obstinate affections, many remedies have been proposed but none have enjoyed any permanence, *e.g.*, the constant current, cupric electrolysis, and the injection of diphtheria antitoxin. It is perhaps questionable whether the second ought not to have had a more extended trial, but it too has been laid aside by the present generation of rhinologists, possibly because it is rather troublesome for both patient and surgeon. So now cleanliness and the occasional

P. McBride

application of a stimulating antiseptic, such as iodine, hold the field in the treatment of this obstinate ailment.

There has been much theorising as to the effect of more or less trivial deviations from the normal in the nose upon ear affections, which probably led to a good deal of unnecessary interference; but to this we shall refer again. The cure of adenoids without operation is a suggestion which springs up from time to time and has been already mentioned. A number of years ago it was stated that they could be cured by breathing exercises, and the latter began to be practised assiduously in all cases. Then the teaching of breathing exercises became magnified into a cult, with the natural consequence that what is really quite simple became elaborated and complicated. Such exercises are probably quite beneficial in slight adenoids, but we soon learned that where serious trouble is being caused by hypertrophy of the pharyngeal tonsil, they are not efficacious. For a time this idea was dormant, but eventually it was revived in another form and scientific nose-blowing was boomed. Now again we hear of another non-operative method, but it does not require any great prophetic talent to predict that while slight cases may improve under any treatment or none, operation will remain the only way of dealing with patients who are suffering from marked nasal obstruction, enlarged cervical glands, and, most important of all, deafness with or without earache.

Otology has provided us with many theories and discarded methods, and most, if not all of them, have had to do with that bugbear of aurists—progressive deafness. Here we had a more or less incurable condition with a very doubtful pathology. It is true that recent investigations have to some extent rectified this, but the propositions we are about to discuss antedated these modern discoveries. The therapeutic history of this form of deafness is very interesting, and supplies a good deal of food for cynical reflection. There was a time when all cases of middle ear deafness with imperforate membranes were labelled catarrh and treated by means of the air douche and remedies applied to the nose. Some pathological condition of the unfortunate nasal organ was sought, and unhappily it was easily found, because few of us have perfect noses. This resulted in operations to put things right, but so far as we know they did not often help the patient to hear. Then a distinguished writer published accounts of cases which had recovered hearing after incision of the tympanic membrane and washing out inspissated secretion—a proceeding rarely practised

Some Discarded Theories and Methods

in the present day. We presume that they must have been examples of subacute inflammation possibly depending on Eustachian obstruction and adenoids. It was also suggested by another well-known aurist that progressive deafness was due to defective action of the muscles acting upon the Eustachian tube, while a second authority substituted the muscles of the middle ear, and both advised electrical treatment. In comparatively modern times we have had electrolysis of the Eustachian tube recommended as beneficial in certain cases, but whether the method is still ever employed is not known to us. Not so very long ago expectations were raised among the non-critical by the suggestion that otosclerosis could be relieved by the application of a preparation made of marrow, but the result was exactly what could have been foretold from the beginning.

Those of us who have had to do with the victims of progressive deafness must have realised how they, of all others, lend themselves to be exploited. They are so pathetically anxious to get better, their friends and relatives are so desirous of helping and encouraging them, that it requires much strength of purpose on the part of the medical man not to be carried away by the suggestions emanating from the patient and his entourage. It would be unfair to impugn the motives of those who, in the past, have recorded results more favourable than we believe to have been possible. Observers vary much in temperament, and when a man is criticising his own handiwork he is notoriously biassed. Given a doctor who has convinced himself of the efficacy of a particular line of therapy, a patient anxious to think he is better, and friends insisting that he is receiving appreciable benefit—this combination may very readily lead to loss of judgment in estimating a result.

In conclusion, it may be well to glance for a moment at some of the epoch-making advances in Oto-laryngology. In laryngology proper we have seen methods of examination such as bronchoscopy and suspension laryngoscopy carried to a point of perfection which would have surprised the pioneers in the specialty. Then, as a result of years of work conducted and checked by animal experiments, we have had the chapter on laryngeal paralysis placed on a scientific footing. Our knowledge of malignant disease—its early diagnosis and treatment—has been perfected by careful clinical observation, and has shown enormous advances as compared with forty years ago.

In rhinology we have become conversant with diseases of the accessory cavities, which until comparatively recent times

P. McBride

were little recognised, but beyond this it cannot be said that any striking advances are to be chronicled excepting in operative technique.

In otology the most important progress has been in surgical measures as applied to the middle ear and endocranium to combat middle ear suppuration and its sequelæ. As minor points may be mentioned our increased knowledge of the pathological causes of deafness and the various tests which are now at our command for investigating the functional activity of the labyrinth.

The object of this brief reference to advances in Laryngology, Rhinology, and Otology is to show that they have all been along the lines laid down at the beginning of this article. Careful clinical observation associated with data derived from physiology, anatomy, or pathology, have been the groundwork of progress in almost every instance. It is a fact worth noting that most discarded theories and methods have lacked such solid foundation, and moreover have seemed to thoughtful observers highly improbable upon their inception. As a final reflection it may be mentioned that the lay journalist almost never refers to any new medical method—general or special—which afterwards comes into scientific prominence as deserving of confidence, and yet many members of the educated public seem to be more influenced by newspaper paragraphs on medical matters than by the more prosaic but also more scientific advice of their medical advisers.

We have thus touched the fringe of an interesting subject, the further study of which would lead us into far-reaching speculations. The psychology of the too credulous observer, the mentality of the too sanguine and hopeful patient, and the boundless optimism of his entourage—we have met with each of these and sometimes with all three together. When they come upon one in combination, they produce mingled sensations of wonder and pity, with just a little contempt and a soupçon of suspicion. The last will, we fear, always obtrude itself when we find that some particular method has had greater prominence in the lay than in the medical press. It may also arise if we find that an unsubstantiated theory is made the reason for numerous consultations or for operative treatment. In such cases we may be guilty of injustice, but worldly wisdom teaches us caution in accepting methods and theories from which their protagonists reap advantages in lucre rather than in scientific repute.

INJURIES TO THE EAR IN MODERN WARFARE.*

By T. JEFFERSON FAULDER, F.R.C.S., Surgeon, Ear and Throat
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IN 1914 and subsequent years numbers of men went to war with damaged ears and hearing impaired in various degrees. Their number is unknown, but there is reason to suppose that it was large. It is probable that ultimately the percentage of aural defects in the army, as a whole, was not very different from that in the adult male civil population. It is true that this point could only be proved absolutely if it were possible to parade and inspect large numbers of men as they were on enlistment or at the beginning of the war. Evidence in this direction is, however, accumulating every day at the Ministry of Pensions.

Examination of the ears was not as a rule made easy by the conditions in which recruiting medical officers did their work. Besides the pressure due to crowds of men wanting to join or rejoin the army, there was in most cases a lack of conveniences for aural examination. Then too there was the excitement of the times and the pardonable feeling that might almost be expressed by the legal term *de minimis non curat lex*. That is to say, the lesser degrees of aural defects seemed trivial in relation to the great business afoot.

Thus in one way or another it came about that men's medical history sheets show little or no record of their aural condition on enlistment, except possibly in the case of gross obvious or active disease, or of high degrees of deafness. This was realised by some people quite early, and to them it seemed necessary that some man or men should be told off to investigate and supervise the aural status of the army under the impending conditions. It would not have been difficult to find a unit of fighting troops whose medical officer knew accurately the previous condition of every man's auditory apparatus, and to use that knowledge and the men concerned as a control experiment.

The points briefly mentioned above have made it difficult to reckon precisely what are the effects of modern war upon the ears and the hearing. We know something about the

* Paper read at the Meeting of the Section of Otology, Royal Society of Medicine, 18th March 1921.

T. Jefferson Faulder

effects of constant noise and vibration, partly from experiments upon animals but mainly from clinical experience of workers in certain trades. We know also, of course, that it is possible to rupture the drum by a blow upon the ear or by an immoderate inflation of the Eustachian tube. But can anyone explain why of two rivetters in a shipyard one is taken and the other left.

There naturally was, and though to a less extent there is still, ignorance as to the effects of the great variety of weapons used in modern war. There was a gun, a shell, a rifle, a machine-gun, a mortar. There were bombs, grenades, mines, and tanks, all of which implements have been vaguely included in the term gunfire, as though the effects of all were the same, or could be the same in all the very varied circumstances in which men came in contact with them. The difference of a few feet or even inches in a man's position can mean the difference between a very severe shock and no injury at all. In reference to artillery, there is another source of error which might be mentioned at this point. It might be supposed that the degree of concussion produced by firing a gun had a simple direct relation to calibre, but such is not the case.

My experiences were all or nearly all obtained in service with artillery, 13-lb., 15-lb., 18-lb., 4.7 and 6-in. guns, and 4.5-in., 5-in., 6-in., 8-in., and 9-in. howitzers. If an obvious statement may be risked here, it is necessary to draw a distinction between the effects of firing such weapons as these and the effects of the explosions of their projectiles. In firing a gun, the factors are the banging of the breech, the detonation, the explosion and recoil, and the departure of the projectile from the muzzle. That is to say a very complex affair. In the case of a shell-burst there is a more or less simple disruptive effect, which in the case of an intensive bombardment can become almost continuous, and is in any case, in my opinion, cumulative in its effects upon the ear.

In nearly twenty years' service with artillery, including three years of the Great War, I have never seen a drum-head ruptured by the firing of a gun except once, when a gunner by inadvertence got somewhere near the muzzle. In this case two fingers were split open, the auricle torn, and the drum disorganised by the blast. I saw a good many cases of hæmorrhage from the ears, in most cases slight, and I must say that granulations or even exposed mucous membrane may

Injuries to the Ear in Modern Warfare

be made to bleed by excessive stimulation. I am certain now that rupture of the drum-head should not be diagnosed solely by the presence of blood in the meatus.

It goes without saying that large numbers of men got impaired hearing. We know also that large numbers served without sustaining any damage to ears or hearing. This statement applies not only to normal ears but also to some cases of chronic catarrhal otitis and recurrent suppurative otitis, and very likely of otosclerosis. This is a point that cannot be ignored, though I know of no explanation.

The degrees of deafness which developed under my observation, including myself, were very varied, but were for the most part not severe. Some recovered as though they had developed resistance, others remained stationary, and yet others were progressive. In most cases there was some reduction of both air and bone conduction, but in some few these were apparently increased, an anomaly which I think might be explained by some form of hyperæsthesia. I formed the opinion after about a year that men with damaged ears, for example cicatrices or perforations, suffered less than those with sound ears. Allowance had, of course, to be made for any impairment of hearing already present, but I was in a position to do this.

We are, in fact, in the presence of an experiment, on a large scale, of excessive stimulation of the eighth nerve. As to the prognosis in this class of case, I can only throw a small amount of light upon it by quoting a few cases.

1. An officer with quite normal ears, after two years, had such a degree of deafness as to become inefficient, his air conduction and bone conduction being both much reduced. This officer has now quite recovered.

2. An officer with rhinitis sicca, a dry perforation of the septum, and chronic catarrhal otitis also became inefficient after two and a half years. In this case I several times saw spontaneous nystagmus, and what was, I suppose, an exaggerated cochleo-palpebral reflex. These symptoms have now disappeared, but the officer is in my opinion more deaf than would be accounted for by the natural progress of the disease.

3. I have seen a great many cases where the only symptom persisting is the subjective one of tinnitus.

I have not much to say about the use of protective appliances, but anything that seriously impairs the hearing by their use seems to be disliked by most men. The reason for this dislike

T. Jefferson Faulder

is, I think, psychological, and will be mentioned later. The only things I ever actually used were plugs of wool moistened with paraffin or glycerin, and those only in special circumstances, when they certainly were a comfort. It is usually necessary for the medical officer himself to see to the application and removal of the plugs.

The ordinary gunpit was open both back and front. Sometimes guns were in the open. In a few places where guns were dug in on a forward slope, the back aperture was lacking, and in this case I think the concussion was about doubled. Similarly, guns fired out of houses or other buildings seemed harder to bear than those in more open places.

I should like now to mention a phenomenon which was as common as any, and which may be called *hyperæsthesia acustica*. After a period of time the various sounds and noises became painful. It had no relation that I could be sure of to the production of deafness, and it was a very definite thing which must, though I admit the difficulty even on the spot, be distinguished from purely psychological nervousness. Men home on leave were hurt by certain similar sounds and noises such as those made by the motors on a tram-car. It must be noticed that in the field in action the sounds and noises in the cases under consideration, although painful, had to be listened for by most men. Wild windy weather was disliked by most people because it interfered with the hearing. I do not see any analogy between this *hyperæsthesia* and the gun headache of civil life.

When one considers the terribly disruptive force of a high explosive shell, one might fairly wonder how any drum-heads escaped damage. No doubt they were ruptured in many cases where there were other severe and fatal injuries. Of the remainder I do not think many could have been observed by any one individual officer. The regimental M.O. had not much opportunity for making scientific investigations, having to get rid of casualties as soon as possible. My own notes, such as they were, got lost. I can only recall three certain cases of rupture of the drum-head. The circumstances were such as to remain ground into the memory. Two of the men had other injuries. The drums were all torn into strips. In one of them no malleus could be seen. In one the fragments of drum lay along the meatus. Deafness, vertigo, nystagmus, and tinnitus were present in all when the initial concussion

Injuries to the Ear in Modern Warfare

permitted of these observations being made. Two of them had staggering gait. The third had injuries which prevented him walking. I did nothing for them beyond giving morphia and cleaning the meatus as well as I could, and disinfecting the auricle with iodine and lightly plugging the orifice. This, I think, is all that should be done in such cases. Thorough cleansing of blood, sand, and mud is generally out of the question, and syringing would certainly mean infection of the middle ear.

I had long suspected that the notion of a drum-head being blown in was not the whole tale. First of all there was the oft-repeated sensation rather like what would be produced by a big Siegle speculum condensing and rarefying the air in the meatus. Next, experiments as to the effects of explosions on partitions were being carried out on a gigantic scale wherever there were walls, windows, and houses. These fell outwards and inwards in the most erratic way. An officer lunching in a ground-floor room with a bedroom above was surprised by a shell bursting on the pavement outside. The ground-floor windows and several articles went into the road, but the upstairs window and part of the wall were scattered all over the bed. These observations to my mind throw light on the mechanism of rupture of the drum-head. There must be in the area of an exploding shell a zone of condensation, a zone of rarefaction, and also a neutral zone. It was not uncommon for two men to be close together and for one to suffer, while the other escaped completely. I am speaking not of wounds but concussion, though of course the same remarks would equally apply to wounds.

Before I finish I may relate a few more experiences. Before my men came into action, that is to say on their way up from the coast, I was very much impressed by the rarity of ear casualties. In a bitter winter the men slept in barns and tumbledown buildings and often in open fields with snow on the ground. I expected a number of casualties, and used to look anxiously at some of the men who I knew had aural troubles previously. On this march, lasting about three weeks, I had only two cases of otitis to send to hospital; they were recurrent cases and they soon returned to us.

The first casualties involving the ears which I met were due to our own fire. A 5-inch howitzer shell hit a twig about five feet from the muzzle, and exploding prematurely killed or wounded all the gun team. Two of the men were deafened but soon recovered. I observed no labyrinthine disturbance

T. Jefferson Faulder

nor injury to the drums. The next aural casualties were more serious, and were the result of one of the guns exploding in a pit and the simultaneous firing of about 200 rounds of cordite in the pit. The gun burst, the breech block blew out, and all the cordite fired. The ear destruction was obscured by the brutal nature of the injuries sustained, being a mixture of wounds and burns terrible to witness. The ear of one gunner was burnt out as though by an actual cautery. The poor fellow had to be chloroformed on the spot.

In the autumn of 1915, during a battle I was asked to examine a soldier under arrest for malingering—a serious predicament for the man, of course. It was said that he shammed fits. Perhaps he did, but at anyrate he had an old perforation of the drum-head with granulations and the fistula symptom. I reported, therefore, labyrinthine disease, and I was glad to think that some knowledge of aural disease had saved him from an early morning bullet.

Up to this time, a period of more than a year, including four set battles and a number of smaller events such as raids upon trenches, I was astonished that aural casualties were so few. But in the second winter the cases of deafness and of recurrent suppuration, as well as of acute otitis, increased in number.

I never had an opportunity of visiting a clearing station or one of the stationary hospitals, and thus my experience of aural surgery in war is small. I must apologise for the scanty nature of this contribution and for the absence of statistics. My notes were lost, and I have had recourse to a war diary which I kept and sent home in a correspondence.

INJURIES TO THE EAR IN MODERN WARFARE.*

By LIONEL COLLEDGE, F.R.C.S., Surgeon, Ear and Throat
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MY observations have been made with an army in the field, but from a position behind the lines. Some notes from an aural centre in an army area may, however, be of interest. The fixed position of the armies, owing to the development of trench warfare, made it possible to develop such a centre, at first in a clearing station and later, on a large scale in an advanced stationary hospital. It served the purposes of retaining in the army area a large number of men and officers who would otherwise have been lost by evacuation to the base, of securing early treatment for acute cases, and of enabling many slight complaints, which otherwise would have gone untreated, to be dealt with. Besides treatment, a large part of the work consisted in classifying men as fit for their duties, or as fit for special duties, such as listening posts, or as totally unfit for front-line work.

A great proportion of the cases were gunners. In one fairly typical month, in which 346 new cases, including officers and men, came to the centre, 66 or nearly 20 per cent. were gunners. Deafness from gunfire, both in field and heavy artillery, was extremely common among them. The lesions from gunfire showed a certain variety. First, those in which the deafness was gradually progressive from prolonged exposure to the noise of gunfire; and secondly, those in which deafness resulted from a single blast, without in either case any visible change, but with definite loss of bone conduction. There was evidently a striking difference in the prognosis in the two classes, the latter class tending to recover more rapidly as a rule, though a few cases complained afterwards of tinnitus. The former class generally showed some improvement with rest, but the improvement was slower and partial, and no doubt a prolonged period of rest was really required. In some cases of deafness following a single explosion there was not only definite loss of bone conduction, but, on inspection, the tympanic membrane was seen to be dotted with minute punctate hæmorrhages. It is an interesting speculation as to whether such hæmorrhages

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Lionel Colledge

occur also in the middle and internal ears, and judging by the analogy of the brain in genuine shell-shock, they probably do. Sudden deafness was more likely to be caused by a bursting shell or exploding mine than by the actual firing of guns, and in many instances the patient had been buried as well.

There was also the class of case in which there was actual rupture of the tympanic membrane. I believe, however, that genuine primary rupture of the tympanic membrane is much less common and is a more severe injury than is generally supposed, and that many cases diagnosed as such were really cases in which granulations or the mucous membrane of the tympanum, exposed through an old perforation, was caused to bleed by the vibration, in the same way that nose-bleeding sometimes occurs from gunfire. The case of the officer, about to be related, whose meatus was full of blood clot was undoubtedly such an one, for there was a clear history of old deafness and ear trouble, yet rupture of the membrane had been diagnosed. Therefore I hesitate to accept statistics compiled in base hospitals, such as those of Chavanne, who has reported an enormous number. The tear seems always to occur in the membrana tensa. There was only one case in which Shrapnell's membrane was ruptured, and in this case the history was probably misleading. Bursting of the ear drum by an engine of war is a more heroic affair than the earache. Such tears mostly heal if left alone, but many suppurated, especially if the ear were syringed. The edges of the tear or perforation bleed fairly freely, or there may be bleeding from the middle ear and the dark clotted blood in the meatus may be mistaken for wax. This occurred in the case of one officer who was accidentally blown up by a mine during the demolition of a bridge, and the syringing away of the supposed wax was followed by an acute attack of middle ear suppuration. The ear became dry in about three weeks.

A pathetic case of rupture of both membranes was that of a young soldier, one of the lads who was sent to France as reinforcements after the disaster to the Fifth Army in 1918. When I saw him he was stone-deaf from concussion, had severe headache, and pus streamed through a ragged tear in each tympanic membrane. Each morning I enquired his age and he always answered 19, until one morning when news came of a train I marked his field medical card "Evacuate Lying." He saw this, and thinking that he was being sent

Injuries to the Ear in Modern Warfare

away for telling lies, he burst into a flood of tears and confessed to the sister of the ward that his age was 16.

The prognosis as regards hearing, if the perforation in the membrane heals, seems remarkably good, and in some cases perfect hearing resulted even after severe suppuration. This has been explained by Bourgeois in the following way. If the tympanic membrane is torn, the force of the explosion is not transmitted through the ossicles but falls at the same time on the oval and round windows, and consequently there is no displacement of the fluid in the labyrinth and no disturbance of the labyrinth, whereas if the membrane remains intact, the chain of ossicles is driven in and the whole force falls on the oval window alone and derangement of the labyrinth results. It certainly appeared that the rupture of the tympanic membrane had exerted some protective influence in many such cases.

This has suggested an explanation of the manner in which the artificial drum acts. Sir Thomas Wrightson, regarding the cochlea as a machine, has pointed out that if the stapes is displaced inwards there must be a precisely equal displacement of fluid outwards at the round window. If an external influence falls on both windows at the same time through a perforation in the tympanic membrane, the effect will be in the proportion to their relative areas, and if these are equal, there should be no displacement of the fluid at all. In the discussion following Sir Thomas Wrightson's paper, Dr Albert Gray pointed out that the artificial drum need not touch the stapes: it is suggested that the artificial drum should not touch the stapes, but should protect the round window from external vibrations and at the same time allow the membrana secundaria to yield outwards in response to movements or vibrations of the fluid originating at the oval window, for both of which functions its peculiar composition, namely a pellet of cotton-wool soaked in liquid vaseline or glycerine, seems to adapt it. In this way the relative conditions between the oval and round windows will be restored to their previous state, the oval window or stapes previously exposed to air vibrations through the membrane and chain of ossicles being now exposed to them through the perforation, whilst the round window previously protected from air vibrations by the tympanic membrane is now protected by the artificial drum. The immediate improvement which occurs, suggests that the explanation is a mechanical one.

Lionel Colledge

Sometimes the resulting perforation is large and will not heal. An interesting case in this connection was that of a sergeant-major of garrison artillery whose tympanic membrane was said to have been burst by the report of a gun in 1898, and apparently the perforation had persisted ever since. He came complaining that gas passed into his throat through his ear and caused him intolerable inconvenience. Such cases were known to occur, but this was the only one observed and the complaint seemed to be a genuine one.

The number of patients with chronic otorrhœa was large, and it was sometimes difficult to determine whether a man was fit for front-line duty or not. Some could be got well by admission and treatment for a few weeks, but the real difficulty lay in cases of attic suppuration, and in cases of polypi with obvious signs of caries. It was difficult to determine to what extent these conditions really troubled the patients, but if they found that the pain, headache, and giddiness were sufficiently severe to make them willing to undergo an operation, they were judged as unfit and treated accordingly, whereas if operation was refused, it was considered that the inconvenience could not be very severe. Many such cases had already been evacuated to England and had undergone long courses of conservative treatment and were now on their way home for the second or third time, and I was thus able to break the endless circular tour, for the patient either returned to his unit or was spoilt for the time being as a soldier by a radical mastoid operation.

I was able on one occasion to save a man from severe punishment. The soldier, a youth of twenty, had served three years in France with his regiment with a perfectly clean conduct sheet. One night when on sentry duty he was visited by his Brigadier, who, thinking he was asleep, had him arrested, and a court-martial sentenced him to ninety days' field punishment. It subsequently appeared, when the verdict was forwarded to the Corps H.Q. for confirmation, that he was to have been sent to me the following day on account of ear trouble, and that he was not really asleep but that, racked with pain and headache, he was sitting down holding his head between his hands. A vast file of papers and the patient were sent to me. He had an aural polypus and extensive mastoid disease. I confirmed my diagnosis, and at the same time made certain he should not serve the sentence in gaol by performing a

Injuries to the Ear in Modern Warfare

radical operation. The proceedings of the court-martial were ultimately quashed by the Army Commander.

No doubt a number of men exaggerated their deafness to a certain extent, but it was gratifying to find that actual malingering was quite uncommon. There were, however, several clear cases. As the subject always complained of a high degree of bilateral deafness, anything less being useless in the circumstances, the tricks with tubes and Stenger's test with two similar tuning forks were of no use in detecting the fraud. A man with normal tympanic membranes may have internal ear deafness or otosclerosis, but a complete absence of bone conduction is most suspicious, and the furtive expression and shifty demeanour combined with it, although difficult to describe, were very characteristic. It was found in actual practice that this combination did not lead one astray. The French have described a simple test, the cochleo-palpebral reflex. It can only be done once, as the patient must be taken off his guard. A sudden noise, such as that produced by hitting a tin with a tongue depressor behind the patient's back, causes him to blink the eyelids. It proved a very useful confirmatory test. One man bolted after leaving his kit behind and was no more seen. Should the patient still refuse to confess, the assistance of Captain Crampton, who takes a special interest in such subjects, was sought. He brought it home to one man by making him answer a list of questions written on a piece of paper, the last question being on the back of the paper. Crampton then repeated the questions, whilst showing the man the paper, and he, taken off his guard, answered the last question before the paper was turned over. The last written question on the back was different to the one spoken.

If such manœuvres failed, chloroform was suggested, and in one case was actually administered. When partially under its influence, the man gave himself away freely, but on coming round he remained as obdurate as ever; he was finally brought to a proper frame of mind by the ministrations of the chaplain.

I have notes of every case, but they are unfortunately very scanty, for the pressure of work was great and there was other work also to be done. Therefore I must ask you to be indulgent, as this paper has no scientific value, but perhaps some of my impressions may have interested you.

CRITICAL REVIEW

THE RIDDLE OF OLFACTION.

By DAN M'KENZIE.*

SCIENTIFIC medicine in general, and rhinology in particular, have both, it must be confessed, neglected the study of olfaction, and we are indebted to Dr Heyninx for directing our attention to the subject in the voluminous *Thèse de Bruxelles* now before us.

Most of the modern works on physiology deal but scantily with olfaction, contenting themselves with a brief summary of the findings of Tyndall and a few other experimenters. We must remember, however, that it is only quite recently that the most important and enlightening work in this department of physiology has been done, since the stimulus to that work, and to the theories it has originated, is a direct result of the change which modern chemistry and physics have brought about in our conception of the nature of matter.

Attempts to refer all natural odours to the combinations of a series of primitive or fundamental odours have now, as the modern perfumer's art would seem to show, been successful, and largely though not wholly as a result of this chemical triumph, Zwaardemaker in 1895, and again in 1910, set about constructing a more or less rational classification of those primitive scents. M. Heyninx, however, goes a step further than Zwaardemaker, and, as the finishing touch to his present work, makes the interesting claim that he is now able to classify them, as colours are classified, in accordance with their wavelength. For it is the thesis laid down and defended in this book that the olfactory sense is stimulated, not mechanically as the ancients with their "odoriferous particles" believed, nor yet chemically as the medical student a few years ago was taught, but physically, by the intra-molecular vibrations of odorous bodies setting up waves in the ether like the waves of light that stimulate the visual sense. Indeed, M. Heyninx is even bold enough to assign a place to odorous waves in the ultra-violet region of the spectrum, so that it would appear, if his views are correct, that the olfactory sense begins where the visual sense leaves off, and that vibrations which are too minute and rapid to be received by the eye are nevertheless received by the nose, to be apprehended by the mind as smell.

At the outset, we must confess, it is difficult for us to conceive how ethereal waves, akin in form and differing only in rate, can give rise to mental sensations so fundamentally unlike as vision and olfaction, and it is but reasonable to expect that the evidence in support of such

* *Essai d'Olfaction Physiologique*, par Heyninx (A.). Thèse présentée à la Faculté de Bruxelles pour l'obtention du titre de docteur spéciale. Vve. L. Larcier, Editeur : Bruxelles, 1919.

The Riddle of Olfaction

a strange conclusion must be thoroughly convincing before this natural reluctance to entertain it can be overcome. *Entia non sunt multiplicanda præter necessitatem*, or as the tag has been paraphrased: Miracle (meaning in this present instance something opposed to the evidence of the senses) is not to be presumed until natural (or simple) causes have been excluded.

This evidence, then, or as much of it as seems to be cogent, we shall now endeavour to place before our readers as clearly and as plainly as its intricate and recondite character will permit.

A detailed survey of the known physical facts connected with *odorivectors* (bodies, the pure chemical molecule of which possesses the quality of odour) shows that, whatever may be the normal physical state of the odorivector, whether it be solid, liquid, or gaseous, its odorous molecules are disseminated and reach the olfactory end-organ as gas (or vapour) in an ærial medium, and as liquid (in solution) in a watery medium.

The proofs of this statement are to be found in the observation of odorous bodies and of the odours they exhale.

For example—to deal only with the ærial medium as that with which we are most familiar—the evaporation of water, that is, its conversion into the gaseous state, varies with the barometric pressure, and the same is true of odours arising from an odorivector. The scents of flowers, as everybody knows, are less noticeable in heavy, thundery weather than they are after the shower has fallen and the air is, as we say, “cleared,” not only because the impact of the rain-drops has mechanically disturbed and laid open the odorous bodies, but also because the atmosphere has become lighter and more permeable. So that odours obey the law of vapours in being more rapidly diffused when pressure is reduced.

Further, it is known that many, if not all, solids and liquids exposed to gas adsorb to their surfaces a thin but dense layer or film of that gas. And the same must be true of substances exposed to odours, since we know how readily smells “cling” to materials.

Moreover, this adsorption satisfactorily accounts for the fact, well known to fox-hunters, that in misty weather odours are but faintly perceived, since the odours given off are then both adsorbed to and absorbed into the minute droplets of water which constitute the mist.

Again, just as volatile liquids evaporate and gases are diffused more rapidly when warm than when cold, so, when the temperature of the air is raised, odours are stronger than when it is lowered. The afternoon and evening of a summer day are richer in perfume than the forenoon, and the poet Gray's epithet of the morn as “incense-breathing” is, we must admit, not very appropriate. The morning, indeed, “smells fresh” just because it is odourless, and this is particularly true of a frosty morning when the odorivectors are sealed

Dan M'Kenzie

up with the water which is wont to carry them into the air. For there can be no doubt that many natural odorous molecules are dissolved in water and are only set free as vapour or gas when, under the influence of warmth and a decreased barometric pressure, the water containing them evaporates.

Thus everything goes to show that the odours which reach us travel in the gaseous state.

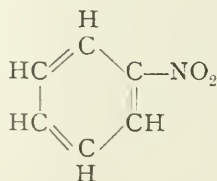
There is one important point here which requires further investigation, investigation which we should have been glad to note had our author undertaken it. This is the point. Many odorous liquids are volatile, and in giving off their odours lose weight, as we might expect. But on the other hand there are many odorous substances (? the essential oils) which seem to suffer no loss of weight in parting with their odours. This we may explain, perhaps, by assuming that the odorous molecules emitted by them are of infinitely minute mass and weight. It is, of course, a well-known fact that an odour may be enormously diluted and yet remain perceptible. Vanillin, for example, can be smelt when it amounts to no more than 0.000,000,005 gm. in a litre of air! This means no doubt that the sensitiveness of the olfactory organ is highly acute for this particular odour. In any case, here is a problem that calls for solution.

Admitting then as proved, that odours to be perceived must become gaseous bodies, we shall now turn to consider what information can be obtained from the chemical structure of odorous molecules. This is instructive, more, perhaps, in telling us what an odour is not, than in telling us what an odour is.

When we run the eye down the list of primitive odorivectors drawn up by Zwaardemaker, and compare their scent with their chemical composition and structure, we find many instances to show that similar or identical atomic groupings belong to the same class of odorivector, or, to put the matter in simpler language, we find that similar compounds give off the same kind of smell.

On the other hand, and here we have a fact of high significance, we also find that there are some substances which have the same smell and yet are chemically quite different from one another, and none show this remarkable combination of likeness and unlikeness more plainly than our nitrobenzol and hydrocyanic acid.

The graphic formula of nitrobenzol is:—



The Riddle of Olfaction

While hydrocyanic acid, HCN, with the same odour, has the graphic formula of $\text{H} - \text{C} \equiv \text{N}$.

From this it is clear that the solution of the mystery of olfaction is not to be found solely in the chemical composition of odorous bodies. But in this consideration of the chemical composition, the ultimate physical state of the odorous molecule and the vibration of the atoms within the molecule are not discussed. In the following section they are, however.

We turn now to the *undulatory theory of odour*. This theory states that the odorous molecules in gaseous form, coming into contact with the olfactory mucosa, act by virtue of their own intra-molecular atomic vibrations, and that the ultimate odorous energy is a vibratory energy having a definite wave-length, which wave-length is always the same for the same variety of odour — just as the wave-length of any monochromatic light is always the same.

That in compound chemical bodies the atoms are grouped in certain definite morphological forms we know; that these atoms are in a constant state of vibration, an-ion and kat-ion attracting and repelling each other within a space, which is to these ions as the solar system is to an orange, we are taught; that these vibrations may communicate some of their energy to the ether to form ethereal waves, as do the vibrations of luminous bodies, we may admit.

To the physicist, therefore, there is in the undulatory theory of odour nothing improbable or even startlingly new. Very much the other way indeed. And his assent to the theory may be granted if he is able to admit the validity of the many facts and arguments adduced by Heyninx in its favour.

Many of these we shall now proceed to relate, though briefly, and it is to be noted that they depend to a large extent upon the results obtained from the spectrum analysis of odours in the gaseous state, and more particularly from the spectrum analysis of the ultra-violet region, effected, of course, by photography since the ultra-violet rays are invisible to the eye.

Most, though not all, of the primitive odours have been examined in this way by many different observers, and it is interesting to learn that these odours absorb more or less of the ultra-violet rays of light. Not only so, but it is claimed that the position of the absorption bands shows some degree of correspondence with what is surmised to be the period of their intra-molecular vibration, and also, as we shall see later on, with the quality of their odour.

Certain bodies, for example, are known to give off different odours according to the degree of their concentration. Thymol is one of these, and when thymol is diluted it smells of thyme, whereas a bottle filled with thymol crystals has a repulsive, a fæculent odour. And we also find that, when concentrated thymol solution is exposed to the

Dan M'Kenzie

penetration of the ultra-violet rays, Vierordt's curve is seen to be displaced towards the region of longer wave-lengths, that is towards the visible violet. (Corresponding probably with the position occupied by scatol, though this has not yet been worked out.)

Again, when the olfactory apparatus is exposed to too great a quantity of perfume, as with the pure essence of violets, nothing but an indefinite odour can be perceived, "like dust and without precise quality." In harmony with this is the fact that when a hyper-concentrated odour is submitted to the spectrum it is seen that the ultra-violet rays are entirely absorbed, without any separation into the usual absorption bands. For this reason, Heyninx compares the characterless odour of concentrated violets with the uniform impression made by colourless light on the visual sense.

Moreover, as in colours and sounds, so in odours there is a harmony between certain kinds of perfume, and some authorities go so far as to refer the quality of certain odours to the presence of harmonics, similar to those which give the *timbre* to musical tones.

Furthermore, just as one sound may silence another, so one odour may "kill" another, as in the familiar instance of iodoform and coffee—a curious circumstance which certainly does look as if we were dealing with waves.

But of all these considerations, and of many more submitted by the author for which we have no room, obviously the most important are those observations of the absorption by odorous bodies of the ultra-violet rays of the spectrum.

Now it is a law of physics that the intra-molecular wave-length of a body absorbent of colour corresponds in period to the wave-length of the colour it absorbs. In other words, waves of a certain length when they meet waves of the same length absorb them. If that is so, and if odorous bodies absorb the ultra-violet rays, then obviously their intra-molecular vibration must be equivalent to the vibration of the ultra-violet rays of light. There is no escape from this conclusion.

Here we pause to interpolate a possible objection to the theory which M. Heyninx does not seem to have considered to be worthy of discussion. It may be said: is not this absorption of the ultra-violet rays of light due perhaps to some chemical or physical property unconnected with odour? Why should we suppose that odour and this peculiar property of absorbing ultra-violet rays are inseparable companions?

Many other facts and deductions from facts are given by the author in support of his hypothesis, and so far as we have gone it must be conceded that if these facts stood alone we could have no hesitation, in spite of *à priori* reasoning, in accepting not only the undulatory theory, but also the ultra-violet refinement of that theory as correct. But alas for our whole-hearted agreement, several other considerations

The Riddle of Olfaction

arise which serve, if not to throw doubt upon the theory, at least to lead us to regard it as not yet firmly and incontestably established!

Before we proceed, however, to discuss those conflicting facts and arguments, we would ask our readers to accompany us into a digression or diversion from the main argument, a diversion which Heyninx very ingeniously contrives to turn to his own advantage while at the same time he seeks to account for what everybody who has at any time pondered over the olfactory sense-organ must always have felt to be a very mysterious fact.

Why is the olfactory sense-organ so highly pigmented? What conceivable olfactory purpose can pigment-granules serve? Yet they do—they must serve a purpose of the utmost importance, since albinos, it is said, have no sense of smell!

(This question, it is interesting to note, was asked by Wm. Ogle,* an English physician, as long ago as 1870, and was answered by him with a suggestion which anticipates in a remarkable way much of what M. Heyninx is now endeavouring to expound.)

Moreover, it is an equally curious fact that the labyrinth also and the retina contain pigment.

As regards the retina, we are here introduced to a new theory of vision, the *optic resonance* theory of Castelli, and as M. Heyninx has adapted this theory to olfaction, we shall devote a little time to its exposition.

We are all familiar with the phenomenon of resonance in acoustics. But perhaps we are not all so familiar with the fact that a like phenomenon exists in connection with electric radiations and also with the waves of light. And, just as an acoustic resonator bears a definite relationship to the wave-length of the sound it picks up, so the optic resonator, there is good reason to believe, bears a similar relationship to the wave-lengths of the light to which it responds. Now, an optic resonator consists of a thin layer of silver, finely divided and arranged in tiny rectangles, and this layer is shown by the microscope to be made up, in reality, of minute granules of the metal, *the dimensions of which correspond to those of the waves of light*.

Again, something akin to a resonating action has been claimed for the spherical granules of a butterfly's wings, and their diameter also is said to be exactly equal to the length of the wave-light of the colour of the wing at the spot from which they are taken.†

* Ogle's original paper will be found in full in the *Med.-Chir. Trans.*, vol. liii., p. 263. M. Heyninx has only been able to obtain a translation of a summary of the paper which appeared in the *B. M. J.*, 1870, i., p. 166.

† Is this correct? The colour emitted can only be that of white light after the absorption of some of its constituents, and the diameter of the granules ought surely to correspond not to the wave-length of the colour they emit, but to that of the colour they absorb!—D. M.

Dan M'Kenzie

This brings us to the retinal pigment-granules, and the imaginative reader will already be able to foretell what we are about to say.

The retinal pigment-granules are said to vary in size from 0.3μ to 1.1μ , that is to say, they are equal in size to the several wave-lengths of visible light. And here we have the resonance theory of Castelli. "The granules," says Castelli, "struck by the rays of white light, are set vibrating with diverse periods in accordance with their varying dimensions, and in correspondence with the different monochromatic rays exciting them"—that is, the longest rays, or reds, activate the largest granules, and so on to the blues, which activate the smallest granules—"and thus the rods and cones are set in motion, and that motion is in turn communicated to the first neurone."

Many of the phenomena of vision seem to support Castelli's theory. They need not detain us.

But it will be observed that the theory rests entirely upon the accurate measurement of these microscopically minute granules of pigment. Now, it is a fact, we are authoritatively informed, that bodies may be accurately measured as low as 0.7μ , but below that point an optical effect is produced, even in the best microscopes, which renders precise measurement difficult if not impossible. We are, to be sure, in these minute dimensions admittedly dealing with the wave-lengths of light itself.

Let us turn to the olfactory pigment. M. Heyninx states that he has measured the olfactory granules and has found that their diameters vary between 0.2μ and 0.3μ . That is to say, they approximate in size to the wave-lengths of the violet and the (invisible) ultra-violet rays. The significance of this observation will at once strike the reader. It supports M. Heyninx's view of odours having a wave-length equal to that of the ultra-violet rays, and it prepares our mind for his suggestion of an *olfactory resonance* theory on all fours with the optic resonance theory of Castelli.

But M. Heyninx does not inform us how he has effected the measurement of the olfactory granules, and, as we have just seen, any figure below 0.7μ is open to serious question. He promises, indeed, that he will detail his method in a future work, but we wish that he had included it in the present treatise, since its importance is paramount.*

* A critical thought occurs to me. The theories, both of Castelli and of Heyninx, depend upon the size of the granules, but they do not account for their colour. Why should they be dark-brown or black? Why pigmented at all? If it be replied that, being black enables them to absorb all light-rays and to repel none, this does not account for the pigmented granules of the cochlea which, we are told, act as resonators also, this time for sound-waves. But the waves of sound are in a different physical category altogether from those of light and odour. Moreover, the waves of sound are of enormous size compared with those of light.—D. M.

The Riddle of Olfaction

Before we leave this section let us add that, just as some people are colour-blind, so, it is said, some people are anosmic to certain odours.

We have called this excursion of Heyninx's a digression from his main theme, although, perhaps, this is the wrong word to use, seeing that this particular section is intended to explain how it is that the olfactory sense-organ is stimulated by the ethereal waves.

Having completed our brief summary of the author's theories, and of the facts and arguments with which he supports them, we shall now indicate what appear to us to be the weak links in his chain of reasoning.

Speaking generally, we are compelled to note that, as is perhaps natural, our author is rather inclined to show a little impatience with adverse facts and arguments, and this is nowhere so unfortunately manifested as in his discussion of Tyndall's findings. More than forty years ago Tyndall, experimenting with odorous vapours, made the observation that these vapours absorb radiant heat rays, that is to say, the invisible infra-red rays at the other end of the spectrum from the ultra-violets. This, to be sure, is a very awkward fact! Because, if as Heyninx contends, the absorption of the ultra-violet rays proves that odorous vapours have an intra-molecular vibratory period of from 0.2μ to 0.3μ , so, we must admit, this finding of Tyndall's proves that they have also a wave-length equal to that of the radiant heat rays, namely, of from 60μ to 0.76μ !

It may be possible, of course, that Tyndall made a mistake. But the only way to prove that he did so would be to repeat his experiments, and this M. Heyninx does not seem to have attempted.

It may also be possible to show that the absorption of the infra-red rays is due to some factor other than the vibration of the odorous molecule, and this is how a recent worker, Gryns, whom M. Heyninx briefly quotes, would account for the phenomenon. But the experiments upon which this opinion is based are not detailed, and the reader is left with his doubts still active and his curiosity unsatisfied.

Turning from Tyndall's findings to consider in a critical spirit M. Heyninx's work on the ultra-violet theory, we are disposed to ask why it is that the orthodox experiments on the ultra-violet rays have not been applied to odorous vapours.

It is true that the ultra-violet rays are absorbed by the atmospheric air; nevertheless, their absorption does not take place so rapidly as to prevent their being subjected to experimental investigation as rays in an aerial medium. That being so, we are entitled to ask why our author has not shown their direct action upon the photographic film. He

Dan M'Kenzie

has undertaken photographic experiments, it is true, but not with the view of demonstrating the presence of ultra-violet rays in odours.

Secondly, we ask, do odorous vibrations communicated to the ether obey like ultra-violet rays the laws of light in being capable of reflection (by quartz mirrors) and of refraction (through quartz prisms)?

Thirdly, do they traverse a vacuum unaffected?

Fourthly, are they or are they not obstructed by the interposition of quartz or tourmaline, substances which are not opaque to ultra-violet rays?

M. Heyninx, however, we must add, assumes that the ultra-violet rays emitted by odorous molecules are very rapidly absorbed by the air, so that they cannot affect the olfactory end-organ in the nose unless they are brought very close to it.

But what influence does the mucus of the nose exercise upon ultra-violet rays? Blood-plasma, we know, absorbs them.

Finally, if we admit that the intra-molecular atomic vibration is the cause of odour, and that, as M. Heyninx states, contact between the odorous molecule and the nasal mucus covering the olfactory end-organ is necessary, why drag in ethereal waves at all? Why should not the atomic vibration be considered as acting directly upon the olfactory end-organ? This possibility, which we find difficult to exclude, brings us round again to something very like the old chemical theory. Obviously, the whole debate is one which deals with the vague and ill-defined boundary line where chemistry and physics meet and mingle.

The need for clearing up these doubtful points we commend to M. Heyninx, and we conclude our long but very imperfect summary of his fascinating book with an expression of gratitude to him for a powerful effort to throw new light into a corner of our workroom which has been too long left in obscurity and neglect.

SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

March 5th, 1920.

President—Mr E. B. WAGGETT, D.S.O.

Description of a Laryngo-stroboscope — Dr E. W. SCRIPTURE.—The novelty in this variety of stroboscope consisted in the use of a powerful arc-light, which threw a beam, like that of sunlight, upon the glottis and illuminated the images in a particularly brilliant manner.

Hæmorrhage during or after Thyro-fissure in the Removal of the Vocal Cord for Intrinsic Cancer of the Larynx, and the Chief Vessel concerned; and its Control—Dr IRWIN MOORE. — Hæmorrhage may occur either during removal of the growth, immediately following removal, or some hours after operation. A small vessel may be found between the arytaenoid and lateral wall of the thyroid cartilage which occasionally spurts and may give considerable trouble in picking up with pressure forceps and ligaturing.

Eight cases of serious hæmorrhage have been reported with four deaths. In most of these cases bleeding was observed during operation to occur from a spurting vessel in the arytaenoid region.

When it is necessary to cut through a considerable amount of muscular tissue close up to or including the arytaenoid cartilage, the superior laryngeal artery may be cut or injured. Since the vessel in this situation lies close against the perichondrium, further separation of the perichondrium from off the thyroid ala is indicated, so as to allow the vessel to be more easily seized by pressure forceps and securely ligatured. I think we shall find this practical point of considerable service in future cases which come under our care.

Bilateral Chronic Empyemata of the Frontal Sinuses: Two Patients on whom the External Operation has been performed—Mr HERBERT TILLEY.—The chief points of interest were:—(1) The large superficial extent of the sinuses; (2) the fact that, after thorough pickling with a liquid compound of bismuth, iodoform and paraffin (B.I.P.), the external wound was sutured at the close of the operation.

The cases appeared to the exhibitor to demand external operation rather than the intranasal method, and he had been impressed by the rapid healing of the large surfaces when they had been treated

Societies' Proceedings

with B.I.P. He had employed this method with complete and rapid success in five cases.

Multiple Sinusitis with Necrosis of Frontal Septum—Dr JAMES DONELAN.—Male, aged 27. The frontal septum and the inferior table of the frontal bone corresponding to it had become carious. The frontal sinuses were of very large size and packed with polypi. The left nasal bone was necrosed along its anterior edge.

Both sinuses were packed with gauze through the incision over the left frontal sinus. A large rubber fronto-nasal drain was put in the floor of each cavity.

The patient made a good recovery.

Frontal Sinus Suppuration: Extradural Abscess—Mr NORMAN PATTERSON.—Female, aged 34. History of blood-stained discharge from right nostril for two or three years. For the last six months the right eye has been nearly closed. Pain over eye and diplopia.

The inferior and posterior walls of the sinus were found to be completely destroyed, and the collection of pus represented a large extradural abscess.

After three operations the patient is now in a satisfactory condition, save for the fact that there is still a large opening present, and pulsating dura can be seen at the bottom of the wound. The cavity shows no signs of becoming obliterated by granulation tissue.

In the discussion upon these cases, opinion upon the treatment of frontal sinus suppuration was somewhat divided as to the choice of an intranasal or external operation. There was a trend of opinion in favour of the latter procedure in chronic cases, the intranasal route being regarded as sufficing in acute cases. Osteo-myelitis was known to occur after the intranasal operation.

Treatment of Sarcoma and Endothelioma of the Nasopharynx by Radium—Drs W. DOUGLAS HARMER and N. S. FINZI.—Malignant Tumours of Tonsil, Pharynx, Palate (soft and hard), Orbit and Naso-pharynx were shown, in all of which radium had been used. Mr Harmer pointed out the striking improvement obtained by radium in endothelioma and sarcoma; the value of burying the radium in the growth, preferably by an aseptic operation from without rather than through the pharynx. The results obtained in cases of carcinoma were not nearly so good, but it was often possible to delay the progress of the growth.

Case of Lupus of the Palate—Mr W. M. MOLLISON.—Male, aged 35, complained of a sore throat for about five weeks. In 1911 he had gonorrhœa; this was followed by a sore throat, but no other symptoms of lues. His wife died of tubercle some months ago.

The diagnosis of lupus contracted from his wife modified by

Royal Society of Medicine

lues was made. The Wassermann reaction was positive. No tubercle bacilli found in sputum.

Case of Streptococcal Ulcer on the Arytænoid—Mr W. M. MOLLISON.—A sister at Guy's Hospital was taken ill with what appeared to be laryngitis; loss of voice, pain on swallowing, a high temperature and definite dyspnoea, preventing sleep. Laryngeal examination showed a superficial ulcer on the right arytænoid, somewhat triangular in shape, covered with white slough and surrounded by a red zone. Twenty c.c. of antistreptococcal serum were injected subcutaneously. The result was satisfactory; in two days the larynx had returned to its normal condition.

Five Cases of Fibroma of the Vocal Cords—Dr J. DUNDAS-GRANT.—In three, the tumour was removed with forceps; in two, destroyed by the galvano-cautery.

Gumma in the Vault of the Naso-pharynx causing Obstruction to Nasal Breathing and Catarrh of the Right Middle Ear—Dr J. DUNDAS-GRANT.—The diagnosis was confirmed by the Wassermann test and the swelling completely subsided under specific treatment.

Dense Growth in the Naso-pharynx simulating Adenoids and producing Extreme Nasal Obstruction and Dullness of Hearing in the Right Ear—Dr J. DUNDAS-GRANT.—It is very dense and seems almost cartilaginous. It may be a sarcomatous growth, with some osteophytic thickening. Apparently it grows more from the back wall than from the basi-sphenoid. The microscopical examination gives a rather doubtful result.

Cyst of the Floor of the Nose—Mr J. F. O'MALLEY.—Quarter-master-Sergeant G. F. W., aged 32. Swelling below left nasal orifice since 1915. Two operations (1915 and 1919) were done under general anæsthesia, and the swelling opened and drained under upper lip. The swelling still contains much pus.

SECTION OF LARYNGOLOGY

May 7th, 1920.

President—Mr E. B. WAGGETT, D.S.O.

Chairman—Dr A. BROWN KELLY.

Caseous Rhinitis—Dr DAN M'KENZIE.—Male, aged 61, complaining of obstruction in the nose. There was an ill-defined though distinct swelling of the right cheek, and a suspicion of some enlarge-

Societies' Proceedings

ment or bulging of the superior maxilla. The patient had lost two stone in weight. There was a foul-smelling discharge from the nose. A fleshy, vascular "growth" was seen inside the nose, bulging from the ethmoidal region of both sides. There was no growth: the nasal forceps ploughed through non-resistant tissue and set free a quantity of caseous, ill-smelling debris. The nasal cavities were finally cleared. The amount of destruction was considerable. No foreign body was found. The Wassermann reaction was negative.

Is the destructive process due to the chemical action of the caseous material or to pressure by its mass?

Dental Abscess of the Nasal Septum—Dr DAN M'KENZIE.—Male, aged 19, developed an alveolar abscess in connection with the root of the right upper lateral incisor. After a few days this broke and discharged, but at the same time his nose became absolutely blocked so that he was quite unable to breathe through it owing to the presence of a septal abscess. It was possible to squeeze pus down from the nose into the mouth, where it emerged from the opening in the gum. The septal cartilage which was crumpled, soft, and pulpy, was removed.

Fibroma of the Nasal Septum—Dr DAN M'KENZIE.—The tumour, which was about the size and shape of a small pea, was attached to the right side of the cartilaginous septum on Little's area. It consisted of connective tissue surrounded by a covering of stratified squamous epithelium, and was remarkably non-vascular.

A Tooth Removed from a Right Secondary Bronchus by Peroral Endoscopy—Mr FRANK A. ROSE.—Lady, aged 63. The tooth was known to be loose and disappeared during the administration of gas before any attempt had been made to extract it. An X-ray examination showed that it had entered the right lung. It was seen through the tube in a secondary posterior bronchus, and it was removed at the second attempt with the help of X-rays.

A Case of Frontal Sinusitis—Mr T. B. LAYTON.—Male, with a swelling of the right orbit and diplopia. No pus in the nose, but the mucous membrane covering the middle turbinal œdematous and polypoid. At the operation a cavity the size of a duck's egg was found occupying the space of the frontal and anterior ethmoidal air cells.

Case of Supraglottic Tumour which proved to be a Cavernous Angelioma—Mr NORMAN PATTERSON and Mr NORMAN PIKE.—(See *Journal of Laryngology and Otology*, February 1921.)

Royal Society of Medicine

Left Frontal Sinus with Acute Suppuration; Radical (Killian) Operation—Dr IRWIN MOORE.—A boy, aged 16. When first seen there was extensive œdema of both the right and left eyelids, together with a large, tense, and painful swelling over the centre of the forehead. The swelling had commenced over the left eye. The left frontal sinus was found full of pus. The right frontal sinus was opened for inspection and found healthy. Patient made an exceedingly rapid recovery due, in the exhibitor's opinion to B.I.P. dressing.

Baby with Depressed Bridge of Nose—Mr W. DOUGLAS HARMER.—No abnormality was noticed at birth; the infant was breast-fed for three weeks, had marked snuffling, difficulty in breathing through the nose and occasional discharge. The bridge of the nose began to drop when the child was three weeks old and the deformity had steadily increased. X-rays show that the nasal bones are depressed, but there is no evidence of destruction or fracture. The child is well nourished, has had no rash nor enlargement of the spleen. Wassermann reactions; mother negative, child negative.

Case of (?) Laryngeal Tuberculosis—Mr LIONEL COLLEDGE.—A young woman with a growth in the anterior commissure uniting the vocal cords. The growth was considered to be a papilloma. As there is active tuberculosis in the lungs and some slight ulceration on the vocal cords, it seems probable that the growth is really an unusual form of tuberculoma.

The Wassermann reaction is negative.

SECTION OF OTOTOLOGY

February 20th, 1920.

Vice-President, Dr ALBERT GRAY, in the Chair.

ABRIDGED REPORT.

Congenital Cupping of the External Auditory Meatus with Keratosis—Mr RICHARD LAKE.—A deep depression filled with a mass of epithelium occupies the external two-thirds of the meatus, with the exception of the orifice. Patient's mother has a similar condition. Specimens exhibited in the Toynbee Museum are examples of this condition, keratosis obturans.

Purulent Otitic Meningitis: Operation; Recovery—Mr J. F. O'MALLEY.—Pensioner, chronic bilateral aural discharge; pain in left ear; vomiting; patient unable to stand. Left mastoid tender,

Societies' Proceedings

intense headache, neck rigid. No nystagmus. Temperature 103.4° F.; Kernig absent. Cerebro-spinal fluid opalescent but little increase in pressure; greyish deposit; polymorphs, 45 per cent. Many Gram-positive diplococci and Gram-negative bacilli. Mastoid operation revealed marked sepsis. Slow but uninterrupted recovery.

Labyrinthitis; Diffuse Purulent Meningitis; Labyrinthectomy: Cure—Dr P. WATSON-WILLIAMS.—Case is reported in full in the *Journal of Laryngology, Rhinology and Otology*, July 1920, p. 197.

Menière's Syndrome—Mr LIONEL COLLEDGE.—Male, aged 42, five years ago suffered from attacks of giddiness, but recovered after a nasal operation. Recently, vertigo and falling forwards; the pavement appears to come up and hit him. Once his face was injured. Deafness and tinnitus in left ear; Weber to right ear. Marked loss of bone conduction and positive Rinne in left ear. Rotation and Caloric tests elicit little or no response. Wassermann reaction positive. Improvement under inunctions of mercury.

A Note on Vestibular Function—Dr DAN M'KENZIE.—As the vestibular and cochlear organs are associated in space, I suggest that their functions are not so different as is generally assumed. That the vestibular end-organ also reacts to sound-waves is probable, because (1) the same system of water-tubes is common to both organs; (2) the footplate of the stapes lies as near, or nearer, to the sense-epithelium of the canals as it does to that of the cochlea; (3) vertigo is known sometimes to be caused by loud sounds; (4) noise deafness is associated with a reduction in the responses to the vestibular tests (D. M., confirmed by J. Ritchie Rodger). What physiological purpose can be served by the reaction to sound-waves of the vestibular end-organ? It is known that general muscle tonus is under the control of sensory impressions derived from the semicircular canals and transmitted through the cerebellum to the skeletal muscles. But muscle tonus persists when the head is perfectly motionless, and for this reason some have assumed the hair-cells of the cristæ to be ciliated cells with a perpetual lashing movement, hastened or slowed by endolymph movements, but not initiated by these movements. It is also agreed that muscular tonus is powerfully affected by sound. The only point in doubt is whether the sound operates through the cochlear epithelium only, or, as I now suggest, also through the canalicular cells. The "start" which frequently follows a sudden loud noise precedes reception of the sound by the consciousness, being affected through a shorter nerve-path than that through the higher cerebral centres. I suggest that it is the result of a sudden stimulation of the canalicular hair-cells.

Many years ago Dr P. M'Bride (*Journ. Anat. and Physiol.*, xvii.) made the same claim for the canalicular response to sound-waves.

Royal Society of Medicine

His arguments are almost precisely the same as mine. M'Bride suggests that the intimate connection between sound-reception and muscular movement in animals results in a turning of the animal's head towards the quarter from which the sound emanates.

Facial Paralysis, with Nerve Deafness and Impaired Vestibular Reactions—Dr DAN M'KENZIE.—Woman, aged 27. Four years ago, after "influenza," left facial paralysis appeared. She was treated with "electricity," but no notice was taken of the severe deafness in the corresponding ear. She had at least two attacks of severe vertigo and vomiting, the first a year before the onset of the paralysis. Examination shows absolute facial paralysis and (nearly absolute) nerve deafness (left), spontaneous nystagmus to the right, a feeble response to cold caloric test in the left ear. No indication of a gross cerebellar lesion; no error in pointing; no changes in optic discs. There is nerve deafness also in the right ear and the Wassermann reaction is "partial positive," so that the lesion is probably syphilitic and meningeal.

Tumours of External Auditory Canal (three Cases)—Mr SYDNEY SCOTT.—(1) S. R., aged 59. Rodent ulcer along posterior and inferior walls of meatus for four years. 1912: the whole of the external osseous and cartilaginous canal was excised. The area was skin-grafted. One year later a small recurrence was removed. Again, three years later, excision of ulcer of doubtful character at site of previous operation.

(2) E. A., aged 25. Deafness and otorrhœa. Exploratory operation. Report: "squamous-celled carcinoma." Second operation: radical mastoid. The osseous and fibro-cartilaginous meatus was removed with the remains of the tympanic ring. The geniculate ganglion was exposed and the stylomastoid foramen. The pre-auricular gland was found histologically free from growth.

(3) Female, aged 60. Right otorrhœa for at least six months, with mastoid swelling. Twitchings of right face, six weeks. Facial palsy, four days. Incision by house surgeon revealed a mass of material at junction of cartilaginous and bony canals. Erosion of bone round aqueductus Fallopii. Dura mater roughened. Pathological report: squamous-celled carcinoma; radical removal (Scott). Patient made a good recovery. Granulating area treated by fulguration twice weekly. Patient died four months later, probably from brain abscess and meningitis (no autopsy).

Labyrinth-sinus or Pressure Nystagmus Symptoms—Mr SYDNEY SCOTT.—A. M., aged 52. Right otorrhœa in childhood, none for thirty years. Lately, when drying her ear, she pressed it, and immediately turned violently round to the right and nearly fell into

Societies' Proceedings

the fire. At the same time a mist came over her eyes. Examination: bilateral attic perforation. Nystagmus obtained by patient pressing her right ear; primary horizontal deviation of both eyeballs to left and slightly quicker secondary phase to right. Primary slight forced movement of head to left. Spontaneous lateral nystagmus to the left. Caloric test normal for superior and external canals.

March 19, 1920.

President—Mr HERBERT TILLEY.

ABRIDGED REPORT.

Chronic "Attic" Suppuration with few Symptoms but Extensive Suppuration in the Mastoid Antrum and Cells—Mr HERBERT TILLEY.—Girl, aged 18. Slight deafness and occasional pain in the left ear since childhood. Small perforation in Shrapnell's membrane from which pus exuded on suction. Slight pain on pressure over antrum. Much difficulty in persuading her parents that surgical intervention was imperative. Antrum full of pus; sinus exposed by disease. Conservative mastoid operation. Case shown because ossiculectomy is still advised by some otologists in chronic attic suppuration. Ossiculectomy in such cases seems to me to be bad surgery.

DISCUSSION.

Mr ARTHUR CHEATLE.—I did not know that any aural surgeon at the present day throughout Europe or America thought of doing ossiculectomy.

Mr E. D. DAVIS.—In order to clean out the attic it is necessary to remove its outer wall and sacrifice the upper part of the drum. The result in some cases has not been very satisfactory, and I have had to perform a radical operation later. Often these patients decline operation as they have no pain, the discharge is only occasional, and the hearing good.

Dr DAN M'KENZIE.—Are those perforations ever caused by anything but cholesteatoma? My experience of the modified operation in these cases has not been very good.

Mr HUNTER TOD.—I do not agree with the emphatic manner in which Mr Cheatle has condemned ossiculectomy. I have published fifty cases and only three required the mastoid operation at a later date. Before performing ossiculectomy I warn the patients that they may have to submit to the mastoid operation later on. In attic cases with granulations or cholesteatoma, ossiculectomy is not advisable. In

Royal Society of Medicine

cases suitable for ossiculectomy one must consider the hearing, because after ossiculectomy the hearing power is the same as after the complete mastoid operation. In ossiculectomy the outer attic wall should always be removed. If the hearing is good, the conservative mastoid operation should be performed. One of my patients has got almost normal hearing power.

Mr J. F. O'MALLEY.—I am inclined to support Mr Cheate's attitude.

Dr W. HILL.—I consider there is a place for ossiculectomy. Certainly I do not think anyone should be ostracised for defending the operation.

Dr DUNDAS GRANT.—The aurist who never does ossiculectomy is not making the most of his resources. There are certainly cases in which the ossicles are matted together and impede the escape of discharge from the attic. In the President's case it was obvious, from the pain on deep pressure over the walls of the mastoid process, that there was deeper disease—a good reason for not being content with ossiculectomy.

Dr KELSON.—It is a question whether the pendulum has not now swung too far. I am certain a good many cases can be cured by appropriate treatment without any operation.

Mr MARK HOVELL.—I support Dr Kelson.

The PRESIDENT (in reply).—I suggest that those who have had experience of ossiculectomy should tabulate their experiences and results so as to give some idea of the class of case in which removal of the ossicles might be successful. In chronic attic suppuration I do not feel I can be sure of success unless I can explore the antrum, where the infection nearly always proves to be.

A Diploëtic Type of Temporal Bone and its Surgical Importance—Mr ARTHUR H. CHEATE.—This type has a layer of diploë running through the outer antral wall, continuous with the diploë of the rest of the bone. The diploë runs between the outer compact layer and the cells which always line the inner aspect of the outer antral wall, but is separated from them by a layer of dense bone of varying thickness. The type is rare, and seven of the eight cases are from males. The type is not always symmetrical. The surgical importance lies in the fact that an acute infection of the antrum is likely to lead to a rapidly spreading infection throughout the whole diploë of the bone (osteo-myelitis), with acute septicæmic symptoms and blood infection. On opening the bone congested diploë are found, with beads of pus scattered through it, and, in order to reach healthy parts, an extensive operation is usually necessary.

Abstracts

Bezold's Mastoiditis—J. F. O'MALLEY. — Male, aged 25. Discharge from right ear for two years. Pain for three weeks. Swelling in neck one week. Temperature 101° F. Operation: extensive bone disease, extending through tip of mastoid. Perisinus abscess.

Blow on the Mastoid Process causing Partial Auditory with Complete Vestibular Paralysis—T. B. LAYTON.—Lieutenant, aged 33, was struck on the base of the right mastoid by a piece of shell-casing. He was deaf in this ear when the bandages were removed, and has remained so. He was unconscious for some minutes after being hit, and continued to have severe attacks of giddiness for some time. Examination: no scar behind the right ear; drum-head intact. Both air and bone-conduction shortened (R.). Weber lateralised to left. When the noise-machine is inserted in the left ear he raises the voice distinctly, but with the right ear there is no response. With the noise-machine going in the left ear he does not respond to the voice. Caloric reaction absent on right side.

Facial Paralysis—J. DUNDAS GRANT.—H. B., aged 7. Discharge from left ear began five weeks ago after a week of pain. Complete left facial paralysis with boggy swelling on floor of meatus. Softened gland below the mastoid. Taste for sugar preserved on left side of tongue.

Healing after Chronic Middle-ear Suppuration—LIONEL COLLEDGE.—Girl, aged 18. Discharge from the left ear for five years following scarlet fever. Ear dry for ten years. Tympanic membrane replaced by a scar, superficial to position of the normal membrane.

ABSTRACTS

NOSE AND ACCESSORY SINUSES.

X-Ray Examination of the Tear Passages. G. VAN GAUGELEN.
(*Acta Oto-Laryngologica*, Vol. ii., fasc. 4.)

It is possible by means of radiography not only to locate strictures and appreciate changes of form in the lachrymal passages, but also to obtain an idea of the size of the lachrymal sac.

After a trial of various substances opaque to the X-rays and suitable for injection of the passages, the author found finely-powdered barium sulphate in twice the quantity of water the most suitable.

Exposures made in two directions, the fronto-occipital and the bi-temporal, give useful information as to changes of form in the passages; but in order to acquire information as to the size of the sac,

Nose and Accessory Sinuses

the writer has employed the position suggested by Rhese in which one edge of the plate rests on the malar bone and the other on the bridge of the nose. In this way the distance between the plate and the sac is reduced to 2 cm. as compared with $3\frac{1}{2}$ to 4 cm. in the fronto-occipital, and $4\frac{1}{2}$ to 5 in the bi-temporal direction. The distance of the focus of rays from the plate being 60 cm., the difference between the actual size of the sac and its shadow on the plate is by Rhese's method only $\frac{2}{60}$.

THOMAS GUTHRIE.

Rare Case of Diffuse Angiomatosis of the Nose and of the Skin.
C. CALDERA. (*Arch. Ital. di Otol.*, Vol. xxxi., 2nd June 1920.)

The following case presents some points of interest from the fact of its comparative rarity. It is one of multiple small angiomata scattered over the mucous membrane and over the skin.

The patient was a woman of fifty, a domestic servant. During adolescence she had had a tendency to epistaxis, which gradually became less and finally ceased in a few years. Three years ago, coincident with the menopause, the epistaxis returned, the attacks becoming more and more frequent and severe till the patient was in a state of profound anæmia. When seen by Caldera her general condition was very poor on account of her anæmia. Her nose was plugged with blood-soaked cotton wool. After careful removal of the plugs, each side of the septum was seen to be dotted over with small red nodules. The largest of these when examined closely were seen to pulsate, and bled on the slightest touch. No vascular network was seen. Similar minute angiomata were found on the skin of the columella and on other parts of the face. These had all appeared after the menopause. Histological examination showed them to be true angiomata. The patient was treated with calcium lactate internally and local applications of trichloroacetic acid with good result.

J. K. MILNE DICKIE.

Further Researches on the Influence of Nasal Tampons on the Bacterial Flora of the Nose. C. CALDERA and C. SARTI. (*Arch. Ital. di Otol.*, Vol. xxxi., No. 3, 1920.)

Simple closure of the nostrils with paraffined cotton wadding causes a marked increase in the numbers of the already existing bacteria in the nasal cavities, without any increase in the varieties. Packing the nose with plain sterilised gauze produces a similar result. Packing the nasal cavities with gauze impregnated with subnitrate of bismuth, ferripirin, coagulene, or almatein also causes a marked increase in the numbers of bacteria. Iodoform, xeroform, or vioform gauze, on the contrary, causes a diminution in the numbers of bacteria.

Abstracts

In carrying out these experiments a control swab was taken in every case before the packing was introduced. The packing was removed after twenty-four hours and another swab taken. The practical results of these observations is that gauze soaked in iodoform, xeroform, or vioform can be safely left in the nose over twenty-four hours without risk of sepsis.

J. K. MILNE DICKIE.

Contribution to the Etiological Study of Ozæna. I. GALLOTTI.
(*Arch. Ital. di Otol.*, Vol. xxxi., No. 2, 1920.)

Following up the work of Alagna, who had found degeneration of the myelin sheaths of the branches of the maxillary division of the trigeminal nerve in cases of ozæna, Gallotti tested the tactile sensibility of the areas supplied by the trigeminal in twelve cases of ozæna of varying degrees of severity. He found no alteration over any of the cutaneous areas, but there was some loss of sensibility of the nasal mucous membrane. He concluded, on various grounds, that the nerve degeneration was secondary to the changes in the nose. Differential blood counts were also done, but a slight increase in the number of leucocytes was the only change observed. Gallotti considers ozæna as a localised symptom of a general morbid condition, sometimes hereditary.

J. K. MILNE DICKIE.

Frequent Causes, and the Treatment of Perennial Hay-Fever. J. C. WALKER, M.D. (*Journ. Amer. Med. Assoc.*, September 1920.)

A long paper containing about thirty case records. The author's general conclusions are as follows:—

Perennial hay-fever is frequently caused by animal emanations, and cutaneous tests should be made with the common animal epidermal proteins. Those patients whose hay-fever is caused by exposure to horses may be successfully treated by repeated inoculation in gradually increasing amounts of the particular epidermal protein to which they are most sensitive.

Those patients who are sensitive to cat-hair protein may be treated similarly with equal success. Sensitisation to feather protein from feather pillows is frequent, and the substitution of floss pillows is desirable. Perennial hay-fever is frequently caused by the ingestion of foods and by the inhalation of the cereal grain flours. Cutaneous tests often reveal such a cause, and omission of the protein is the desirable mode of treatment.

Patients who have seasonal pollen hay-fever, frequently have paroxysmal symptoms throughout the year. Satisfactory preseasonal treatment with the particular pollen that causes the seasonal hay-fever, frequently relieves the perennial symptoms.

Recurring head colds are frequently coincident with the foregoing

Nose and Accessory Sinuses

sensitisations, and the relief from these head colds usually follows proper treatment, as already outlined. This type of head cold is probably not due to an infection, but rather a result of sensitisation which renders the nasal mucous membrane easily irritable.

Non-sensitive patients with perennial hay-fever or vaso-motor rhinitis, provided there are no demonstrable abnormalities, growths, and the like in the nasal cavities or sinuses, are sometimes benefited by autogenous vaccines made from the nasal secretions.

Olfactory vaso-motor rhinitis, or pseudo-hay-fever caused by mechanical, thermal, chemical, and odorific irritants, is not uncommon and should be recognised.

The ingestion of foods may cause symptoms referable to the eyes alone. Therefore, although protein sensitisation should not be considered as a "cure all" or a cause of all obscure conditions, the cutaneous test deserves a place among diagnostic tests, and when properly performed and interpreted, it is a very useful test.

ARCHER RYLAND.

The Middle Turbinate in Relation to Acute Inflammation in the Sinuses. LUBET-BARBON and BERNADIE. (*L'Oto-Rhino-Laryngologie Internationale*, March 1921.)

Certain patients, during the course of an ordinary cold in the head, either towards the end of the illness or sometimes when it has almost disappeared, suffer from a constant, depressing pain in the region of the sinuses.

When the maxillary sinus is at fault, the patient complains of hunger and of a feeling of weight in the jaw-bones; when the frontal sinus is affected, the pain is very depressing. The patient is unable to carry out his customary duties, and the pain is intermittent in character, appearing in the forenoon, gradually becoming worse, and moderating in severity in the afternoon without any treatment. Sometimes, when the pain is at its worst, a small bead of pus may be blown from the nose, at other times a gelatinous mass, and this gives temporary relief.

On examination, the nasal mucous membrane is found to be engorged; but after cocainisation, one sees a little pus in the middle meatus—not a stream of pus filling the whole meatus and flowing over the inferior turbinal, but a little quantity of pus between the head of the middle turbinal and the agger cells. Sometimes the middle turbinal touches the septum, which is thickened at that point. On the affected side, the head of the turbinal is enlarged, the ethmoidal bulla is not easily made out, and the agger cells are prominent. Sometimes the posterior end of the turbinal blocks the posterior sinuses, causing obstruction to the drainage of these cells.

Abstracts

Any inflammation of the nasal mucous membrane extends to all the sinuses, just as the mastoid antrum is always involved in otitis media. Probably, as the attacks become repeated, the drainage becomes inefficient, and in a patient who is subject to sinusitis, the middle turbinals are never symmetrical. Transillumination very often gives an equal result, or there may be a little darkness of the affected side. Proof puncture is always negative.

Treatment. — During the acute attack, daily drying and the cocainisation of the middle turbinal and meatus at the worst or most painful time are indicated. If the attacks return, the writers recommend resection of the turbinal, of the head for the maxillary and frontal sinuses, with perhaps curettage of the ethmoidal bulla, and of the posterior portion for the sphenoidal sinus.

GAVIN YOUNG.

The Treatment of Acute Nasal Sinusitis. Sir ST CLAIR THOMSON.
(*Practitioner*, January 1921.)

In a short paper, the symptoms of the acute condition are dealt with for the benefit of the general practitioner who sees the patient, as a rule, at that stage. The author asserts that comparatively few cases would reach the more serious chronic condition if proper treatment were applied at the outset. The relationship of sinus invasion to an ordinary nasal coryza is explained, and Skillern's diagram of pain-areas is reproduced. Treatment consists in facilitating discharge and soothing pain, rest in bed, local heat, inhalations, analgesics, salicylates, and the electric head-bath. In cases which have passed to the subacute stage repeated lavage is strongly urged—every second day. Lavage should be given a trial in all cases with a history of less than a year, and the radical operation can thus be frequently avoided.

T. RITCHIE RODGER.

The Maxillary Antrum. LOMBARD and LE MÉE. (*Revue de Laryngologie*, December 1920.)

These authors have investigated radioscopically the drainage of the antrum after operation. The antrum was filled with bismuth paste, which was allowed to flow out again after a short interval. Radiographic examination showed where the evacuation of the paste was incomplete. The results showed that the anterior angle of the sinus between the nasal, buccal, and palatine walls was the most important "dead space," and that drainage of this space could only be satisfactorily effected by an operation involving the removal of the anterior angle. The actual operation described

Larynx

only differs from Denker's procedure in that a more limited removal of the anterior wall and of the inferior turbinal is rightly insisted on.

G. WILKINSON.

LARYNX.

The Possibilities of curing Advanced Laryngeal Tuberculosis. WOLFF FREUDENTHAL. (*Annals of Otology*, September 1920.)

The author ventures to say that the cure of laryngeal tuberculosis is possible even in the advanced stage. His experience with this disease extends over twenty-five years, during which time he treated hundreds of cases annually.

The greater part of the paper is devoted to the three principal symptoms, viz., cough, dysphagia, and stenosis of the larynx.

The main conclusions are:—(1) Primary tuberculosis of the larynx does occur, and more frequently than has hitherto been accepted. (2) The prognosis of an established tuberculosis of the upper air passages is better than it used to be years ago. (3) All patients suffering from pulmonary tuberculosis should be advised to undergo a laryngeal examination, not only when the disease is diagnosed or on entering a sanatorium, but also at regular intervals, irrespective of their complaints. (4) The means at our disposal for the treatment of such patients are numerous and should be used. (5) Success depends upon untiring and arduous work on the part of the attending laryngologist. (6) Whenever the larynx is affected, the patient should be under the supervision of a laryngologist who is to take care of his lungs as well. In other words, the laryngologist should direct the general as well as the special treatment in all cases with laryngeal involvement.

ARCHER RYLAND.

The Treatment of Laryngeal Tuberculosis, especially with X-Rays.

P. RAMDOHR. (*Z. f. Ohrenheilk*, Bd. 79, H. 1-2, 1920.)

The author gives a detailed account of his experiences with X-rays in the treatment of laryngeal tuberculosis. He uses much larger doses than is the habit with most other specialists. He concludes that in the presence of pain and inflammatory œdema, a certain amount of relief from pain is obtained by the use of X-rays. In infiltrative processes, especially on the posterior wall of the larynx, there is improvement, and the healing over of ulcers is hastened. X-rays should be tried in all cases in which local therapy is indicated, and especially when other methods have been unavailing. In deep infiltrations they are to be preferred to active local treatment in order to avoid artificial ulceration, and pain and discomfort to the patient.

J. K. MILNE DICKIE.

Abstracts

The Treatment of Laryngeal Tuberculosis by Means of General Carbon Arc-Light Baths. N. R. BLEGVAD. (*Acta Oto-Laryngologica*, Vol. ii., fasc. 3.)

After reference to the history of the subject, the author describes the method practised in his clinic during the last two and a half years. The patient, lying completely naked, is exposed to the light of four powerful 20-ampere arc lamps. The sittings, which take place daily, last at first for a quarter of an hour, and their duration is gradually increased to one hour. Of the 74 patients treated, complete healing of the laryngeal disease took place in 17; 35 showed improvement, which was marked in 16 and of moderate degree in 19; 6 remained unaltered, and in 16 the disease progressed in spite of the treatment. Many of the cases also received local treatment, especially galvano-cautery puncture.

The light baths gave the most rapid results in cases of ulceration and of oedematous swelling of the arytenoid region. Tuberculous infiltrations were also favourably influenced, but when these were of large size the galvano-cautery puncture was found to be of great assistance, giving sometimes wonderfully good results. The pain also in cases of ulceration about the introitus laryngis was greatly relieved by the light baths.

In some cases the laryngeal and the lung disease improved *pari passu*; in many, however, the two affections showed no parallelism, the laryngeal disease healing while the pulmonary advanced or *vice versâ* a fact which serves to emphasise the importance of regarding laryngeal tuberculosis (like true "surgical" tuberculosis) as a condition which demands separate and special treatment of a kind which can only be satisfactorily carried out by a trained laryngologist.

Although the light baths do not yield quite such good results in laryngeal as in true "surgical" tuberculosis, the writer believes them, when combined with local surgical treatment, to be more successful than any other known method.

A large number of the case histories are given with diagrams showing the extent and variety of the local disease.

THOMAS GUTHRIE.

A Case of Chondroma of the Larynx. H. DE GROOT.
(*Acta Oto-Laryngologica*, Vol. ii., fasc. 3.)

Chondromata of the larynx are rare growths, the case here reported being the forty-fifth on record. The tumour grew from the arytenoid, a situation recorded in only four of the previous cases, and among these it was unique in that it attained the size of a nut and weighed 6 grams. In spite of its size it produced no difficulty of respiration or

Miscellaneous

deglutition, but the patient, a soldier, 37 years of age, had been hoarse for nine years, and when seen by the author was almost aphonic. The diagnosis was much assisted by radiography and by digital palpation, a growth of hard consistence in the larynx being always suggestive of chondroma.

Removal by laryngo-fissure was successfully accomplished, but the voice remained hoarse owing chiefly to fixation of the right arytenoid from which the growth originated.

THOMAS GUTHRIE.

MISCELLANEOUS.

The Surgical Treatment of Cysts of the Thyro-glossal Tract. W. E. SISTRUNK (Mayo Clinic). (*American Journal of Surgery*, February 1920.)

The duct, as far up as the hyoid bone, is isolated by dissection in the ordinary way. Between the hyoid bone and the foramen cæcum, however, the epithelial tract is so small and friable that it is easily broken and difficult to follow. The author makes no attempt to define this portion of the duct, but instead resects the central portion of the hyoid bone, and above this a strand of tissue about a quarter of an inch across, stretching from the hyoid bone to the foramen cæcum, and presumably having the epithelial tract in its centre. This strand of resected tissue stretches backwards in the middle line at an angle of 45° from the upper surface of the centre of the hyoid bone. The tissue resected from below upwards consists of the central portion of the hyoid bone, a portion of the median raphæ of the mylo-hyoid muscles, and of the genio-hyo-glossus muscle and the foramen cæcum. The opening into the mouth is closed with sutures, and buried sutures are used for approximating the genio-hyo-glossus muscles. No ill effects result from the hyoid resection, and no serious sepsis results from the wound entering the mouth.

GILBERT CHUBB.

Asthma and Anaphylaxis. FRANK COLE. (*Brit. Med. Journ.*, 12th March 1921.)

The explanation offered of anaphylaxis is that after an injection of horse-serum the antibody or "digestive substance" is produced by the host to deal with the foreign protein. The continued presence of this digestive substance in the blood constitutes a "sensitive" condition lasting a variable time, sometimes even a lifetime, and a reinjection of the same serum during the sensitive period is liable to produce the clinical symptoms of anaphylaxis. The fatal issue is comparatively rare in man, but seems to be more easily induced in animals.

The writer holds that "half the cases of asthma can be proved to

Abstracts

be due to sensitisation by foreign proteins." "Hay-fever is due to sensitiveness to pollen, not as a mechanical irritant, but from its protein content." He refers to the conjunctival and skin reaction obtained by the use of the test-sets elaborated at St Mary's Hospital, and states that his own testing apparatus includes some 70 foods, 20 bacterial proteins, 10 kinds of animal hair, and 10 pollens. Each case must be patiently studied till the exciting cause is found. This may be the presence of cats, dogs, or horses, as well as certain articles of diet, and, among the latter, of substances closely allied one may be inimical while another is not. The hair of one person may excite asthma in another. The abrupt release from asthma by removing a patient inland from the seaside, or *vice versa* is in many cases not attributable to change of air but to leaving behind the family cat or dog or feather-bed. Numerous most interesting cases in the author's experience are cited.

His theory seems to be that there is an initial exposure to the exciting cause, with or without a predetermining hereditary element; antibodies are produced as a result, and the victim remains "sensitive," so that every fresh exposure is followed by a modified anaphylaxis which we call an attack of asthma. The earlier in life the cause can be determined the more easy is the cure. Urticaria, eczema, migraine, epilepsy, and paroxysmal hæmoglobinuria are held to be other forms of anaphylaxis.

Probably most of us have been disappointed in the prophylactic and curative value of injections based on the above-mentioned conjunctival tests, but if these or the analogous skin reactions can be used in the less ambitious rôle, as the author describes, of searching out exciting causes so that these can be eliminated from the diet or the environment of the patient, a distinct advance would fall to be recorded in the treatment of one of the most baffling disorders.

T. RITCHIE RODGER.

A Case of Amyloid Tumour in the Palate and Nasal Cavity.

G. HOLMGREN. (*Acta Oto-Laryngologica*, vol. ii., fasc. 3.)

The patient was a man 65 years of age who had noticed a solid tumour of the palate for ten years. The growth occupied almost the whole of the hard palate and the front part of the soft. Its surface was smooth, bright red and glossy, excepting at its most dependent part, where was an ulcerated area with necrotic base and extremely foetid discharge. The middle portion of the floor of the right nasal cavity was occupied by a growth the size of an almond, bleeding freely on palpation.

Portions removed for examination showed only necrotic tissue, and the diagnosis was not established until operation was undertaken for

Review of Book

removal of the entire growth. This was successfully accomplished without perforating the mucous membrane of either the floor of the nasal cavity or the posterior surface of the soft palate. The wound healed without difficulty and radium treatment was subsequently carried out.

Amyloid tumours are rare. The upper air passages are their favourite situation, and 62 cases, including the present one, have been reported. The male sex is affected three times as often as the female. They are met with at any age of adult life. They usually grow slowly and are painless. They occur most often in the larynx, then the trachea, and then the tongue, while isolated examples have been met with in the tonsil, pharynx, and bronchi. The author's case, which involved the palate and nasal floor, is unique in man, but amyloid tumours of the nose have been met with in horses.

THOMAS GUTHRIE.

REVIEW OF BOOK

The Extra Pharmacopæia. MARTINDALE and WESTCOTT. Seventeenth Edition (in two volumes), Vol. I. Revised by W. Harrison Martindale, Ph.D., F.C.S., and W. Wynn Westcott, M.B.Lond., D.P.H. 27s. net. H. K. Lewis: London. 1920.

The first volume of the 17th Edition of Martindale and Westcott's *Extra Pharmacopæia* is now in our hands, as it no doubt is in the hands of all who wish to keep up to date in the therapeutic art. This edition is a specially interesting one as being the first issued since January 1915, and therefore the first to embody the experiences acquired in the course of the great war. A very strong plea is made for the encouragement of our own people in the art of manufacturing, rather than in buying and providing the means to buy the new chemicals and drugs for which in former years we have had to apply to enemy aliens.

Among the new chemicals and drugs to which special reference is made are the hypochlorite compounds, the arseno-benzol developments, peptone injections for asthma, etc., while somewhat faint praise is given to colloidal metals and to hypertonic saline (page xv). The misleading nature of the working formulæ for preparing various organic chemical compounds, as given in the original specifications, is referred to, with the suggestion that this was not in every case unintentional. A large number have been reinvestigated, and much new information with regard to them is given in this work.

The instructions for the manufacture of anæsthesin seem extremely complicated, but it is pleasing to think that this valuable remedy which

Obituaries

is so much in demand for tuberculosis of the larynx can be prepared in this country, though it may be under some other name, such as anesthone, benzocaine, or para-amido-ethyl-benzoate.

We have it on good authority that a very famous London physician always had this work at his side, and we are quite sure that he would have maintained this tradition and supplied himself with each fresh edition as it came out.

JAMES DUNDAS-GRANT.

OBITUARIES

PROFESSOR GUSTAV KILLIAN

PROFESSOR GUSTAV KILLIAN, who passed away at the age of 61 on the 21st of February of the present year, was certainly one of the leading spirits, or, indeed, the leading spirit, in the world of Rhino-Laryngology during a great part of his active professional life. The progress effected as the direct result of his boldness of conception, his ingenuity, and his determined skill has been the establishment of an era in our specialty which will long and perhaps always be identified with his name and personality.

It is to the genius of Kirstein that we owe the first conception of obtaining a direct view of the larynx, by his so-called autoscopy, but the wider and bolder advances made by Killian reduced this to a very secondary position, and established bronchoscopy as the gigantic branch of laryngology, and with its extensions, cesophagoscopy and gastroscopy, as an indispensable factor in the practice of internal medicine.

Killian seemed never to have exhausted his resources, but was always ready with something new. Thus, almost before we had mastered his technique in regard to bronchoscopy, he surprised us by devising and perfecting the most unpromising-looking manœuvre of suspension laryngoscopy. The cumbrous apparatus was, at first sight, rather forbidding, and the further help it afforded may be admitted to be slight in proportion to its complexity, but the proceeding was a bold one, and it achieved what its inventor claimed for it. It certainly enables us to perform explorations and operations on the larynges of children under general anæsthetics which were not previously possible.

Killian's radical operation is almost the "last word" in the operative treatment of chronic suppuration of the frontal sinus. In spite of the disappointments and the distressing complications which occasionally follow this operation, or any operation on the sinus, or

Obituaries

frontal sinus disease without operation, the results are so constantly gratifying that no other operation has actually displaced it from its unique position. Similarly, the variations on Killian's sub-mucous resection of the nasal septum are comparatively trivial, and whoever practises the operation as described by him need not depart from it in any significant degree. A writer on the subject said a number of years ago that every rhinologist *must* learn Killian's method of sub-mucous resection, and it is not too much to say that the same is true of the frontal sinus operation.

Among his minutiae may be mentioned a means of testing the swallowing capacity of the patient by means of food broken up to various standardised degrees of fineness. Another was an apparatus for testing the sensibility of the nasal mucous membrane by means of a fine thread of cotton projecting through a hollow tube to a greater or lesser length. He could study small things as well as great ones.

The incidents of his life were marked by steady simple progress. He was born in Mayence in 1860, and was the son of a schoolmaster. He studied medicine in Strassburg, Freiburg, Berlin, and Heidelberg, and then, at the instigation of "the other Killian," his elder brother, Johann August Killian (of Worms), he took up the study of the specialty in Berlin under Hartmann and Krause. Eventually he succeeded Hack (whose work on nasal reflexes is at present rather neglected) as Director of the Throat and Nose Department, and subsequently Professor in the University of Freiburg. Many were the pilgrimages made to his clinic to acquire invaluable information and instruction, and incidentally to taste the famous trout of the Black Forest in his beautiful and happy home in Freiburg. When the celebrated Professor B. Fränkel passed away, all eyes were turned on Killian as his successor, and after some unaccountable hesitation he was called to Berlin to become Professor in the Kaiser Wilhelm Academy and Director of the University Clinic for Diseases of the Nose and Throat, the Aural Clinic being already under the charge of his distinguished colleague, Professor Passow.

His interests were mainly in his special work rather than in general culture and affairs, but he showed his capacity for learning by the command of the English language he acquired in his later years, his capacity for speaking it being previously comparatively small.

Professor Killian always received here, as in America, the warmest recognition of his outstanding ability and achievements, and proud and jealous as we are of the initiative genius of the Anglo-Saxon, there is no English-speaking rhino-laryngologist who would withhold from the late Professor Gustav Killian the honour of having been in his time the foremost figure among the practitioners of the specialty. He was always bright and buoyant—almost boyish—in his pleasure in his

Obituaries

technical triumphs, and if in his pleased smile there was a suggestion of the consciousness of his superiority, he was well entitled to it.

JAMES DUNDAS-GRANT.

DR WALTER JACKSON FREEMAN (PHILADELPHIA, U.S.A.).

At his home, in Spruce Street, Dr Walter J. Freeman died on 20th December 1920. He studied at Cornell and graduated in the University of Pennsylvania. Between 1886 and 1890 he was in Europe studying in London, Berlin, Munich, and Florence.

He was a well-known laryngologist, and belonged, since 1901, to the select body of the American Laryngological Association.—ST C. T.

ARTHUR WASHINGTON DE ROALDES

(NEW ORLEANS, U.S.A.).

All who met De Roaldes at the various Congresses he frequented in Europe during the last decade of last century will hear with regret of his death. Of French descent, he combined the charm and vivacity of the Latin race with the sterling qualities of the Anglo-Saxon. Speaking fluent French, decorated with the Legion of Honour for his gallantry at the Battle of Sedan, he was as much at home in New York, Paris, and London as in his own state, Louisiana, where for many years he was the leading figure in laryngology.—ST C. T.

WALTER FRANKLIN CHAPPELL (NEW YORK, U.S.A.).

The death of Walter Chappell robs New York of one of its most successful laryngologists, a man who was as popular with his colleagues as with his patients. For several reasons he was a close link between America, Canada, and Great Britain. His father was born in Gloucester and his mother in Ireland. He was born in Canada, studied in Toronto and then came to England, where he worked under Morell Mackenzie and Sir Frederick Treves, taking the Diploma of M.R.C.S. He practised for a time in the east end of London; he next joined the British Navy as a surgeon, and was on board H.M.S. *Condor* when she bombarded the forts of Alexandria under the command of the late Lord Charles Beresford. Dr Chappell was one of a landing party when a shell wrecked the boat and he had to swim for shore. He reached it safely but with several wounds on his head and shoulders and minus five teeth. He retired from the Navy, settled in New York, and became attached, in the year 1886, to the Manhattan Eye and Ear Hospital. He rose from Clinical Assistant to be President of the Board of Surgeons.

His professional success is described as "phenomenal."

To some, his reticence made him appear ungenial, but his many friends were devoted to him on account of his bright disposition and his unswerving loyalty.—ST C. T.

GENERAL NOTES

The Thirteenth Meeting of the Scottish Otological and Laryngological Society will be held in the Ear and Throat Department, Royal Infirmary, Edinburgh, on Saturday, 11th June. President, Mr Henry Peterkin.

Patients will be in attendance for examination at 3 P.M. Discussion at 4.15 o'clock. The Dinner will be held at Ferguson & Forrester's Restaurant, 129 Princes Street, at 6.45 o'clock.

* * *

A combined Meeting of members of the American Otological Society and members of the Section of Otology of the Royal Society of Medicine will take place in London on Monday, 11th July, and following days.

* * *

The British Medical Association will hold its Annual Meeting at Newcastle-on-Tyne on 19th, 20th, and 21st July. The following are the Office-bearers of the combined Sections of Laryngology and Otology:—*President*, G. William Hill, M.D. *Vice-Presidents*, James Don, M.D.; R. Gordon Bell, M.D.; Dan M'Kenzie, F.R.C.S.E. *Hon. Secretaries*, Lionel Colledge, F.R.C.S. (22 Queen Anne Street, London, W. 1); W. Frank Wilson, M.B., B.S. (97 Jesmond Road, Newcastle-on-Tyne).

The Special Sectional Meetings will be held on Wednesday 20th and Thursday 21st.

* * *

There will be an International Conference on Tuberculosis in London on 26th, 27th, and 28th July, under the Presidency of Sir Robert Philip, Professor of Tuberculosis in the University of Edinburgh.

* * *

La Société Belge d'Oto-Laryngologie will hold its Summer Meeting in Brussels on 9th July at 2 P.M., and following days. Further information will appear in our next issue.

* * *

At the recent Annual Meeting of *La Société Française d'Oto-Rhino-Laryngologie*, Dr G. William Hill of London and Dr P. Watson-Williams of Bristol were elected Corresponding Members. Sir James Dundas-Grant and Dr William Hill represented British specialists at the Congress.

General Notes

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W.

Section of Laryngology (President, Dr W. Jobson Horne).—The Ordinary Meeting of the Section will be held on Friday, 3rd June, at 4 P.M.

The Summer Meeting of the Section will be held on 2nd, 3rd, and 4th June. The Programme of the Meeting appeared in the May number of the Journal.

The Dinner in connection with the Meeting will take place at the Trocadero Restaurant, Piccadilly, W., on *Friday evening, 3rd June* (hour 7.30 for 7.45 o'clock).

* * *

THE JOURNAL OF LARYNGOLOGY AND OTOTOLOGY, LIMITED.

A Limited Liability Company has been registered under the above title, after taking over from the recent publishers the copyright and ownership of the Journal. The Capital of the Company is £2000, divided into shares of £5 each. Of this amount £1545 have already been paid up by 97 subscribers.

The Shareholders at the First General Meeting elected the following Directors:—Sir William Milligan (Chairman), Sir James Dundas-Grant, Mr Herbert Tilley, Mr W. M. Mollison, and Mr W. G. Howarth.

The Directors are *ex-officio* Members of the Editorial Committee, which was constituted as follows:—Sir St Clair Thomson (Chairman), Sir Charles Ballance, K.C.M.G., Mr A. H. Cheate, Dr James Donelan, Mr T. Jefferson Faulder, Mr A. A. Gray, Mr Thomas Guthrie, Mr Douglas Harmer, Dr G. William Hill, Dr James Horgan, Mr A. J. Hutchison, Dr A. Brown Kelly, Mr Richard Lake, Dr Dan M'Kenzie, Dr D. R. Paterson, Dr Frederick Spicer, Mr Archer Ryland, Mr Hunter Tod, Mr E. B. Waggett, Dr P. Watson Williams, and Mr Andrew Wylie, with Mr Archer Ryland as Hon. Secretary of the Committee.

The Solicitors of the Company are Messrs Morris, Veasey & Co. The Registered Office of the Company is at 11 Chandos Street, London, W.1; and the Secretary is Mr George Bethell, to whom all inquiries with regard to the purchase and transfer of shares should be addressed. Any oto-laryngologists who are not yet shareholders, and who might desire to take up any of the still unissued shares, should communicate with Mr Bethell.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

VESTIBULAR FACE REFLEXES.*

By S. MYGIND, M.D., Assistant Surgeon to the Ear and Throat
Department of the Commune Hospital of Copenhagen. (Director,
Professor Holger Mygind.)

IN 1910, Bartels (*Arch. f. Ophthalmologie*, vol. lxxvi., p. 1) pointed out a peculiar reflex of the eyelid in newly born infants. By bending the infant forward so that its face pointed downwards, he could make it lift the upper eyelid, the frontal muscle being contracted at the same time. Bartels supposes that this reflex, which may be observed in the prematurely born foetus at the end of the fifth month and also in sleeping infants, is due to a labyrinthine irritation, though he admits that this cannot be proved. The reflex cannot be of optic origin as the possibility of optic fixation is precluded at that age. Bartels also states that when the forward bending movement is performed sufficiently slowly no upward movement of the bulbi appears.

Alexander has carried out a series of exhaustive investigations referring to vestibular reaction in infants on rotation, but has not observed any frontal or eyelid reflex (*Zeitschrift f. Sinnesphysiologie*, vol. xlix., p. 153 (1910).

These rotation investigations have been taken up again by Bárány (*Acta Oto-laryngologica*, vol. i. p. 97). By rotation in the sagittal plane he found a reflex in the form of a lifting of the upper eyelid and a wrinkling of the forehead, con-

* This paper was completed two years ago, but owing to unforeseen circumstances publication was delayed.

S. Mygind

temporary with a nystagmus downwards or a corresponding slow phase upwards.

Before the latter observations were published, and, indeed, before reading Bartels' article, I had carried out, with another object in view, a series of vestibular examinations in infants. During these investigations the conditions connected with vertical nystagmus were also examined. Like Bárány, I found that the downward nystagmus, which, even in individuals who were awake, was often represented only by a slow phase upwards, was accompanied by a transverse wrinkling of the forehead and drawing up of the eyelids. The wrinkling of the forehead may be particularly marked.

Besides, I have also seen a contemporaneous upward curl of the upper lip; it would therefore appear that it is a question of an upward movement of all the muscles of the face.

There is, however, not only a vestibular *upward* reaction of the facial nerve. When a vertical nystagmus upwards, which may only appear as a slow phase downwards, is produced, an active drawing down of the eyebrows may be seen, corresponding to the slow phase. The forehead also is more smooth and strained. This reaction, which has escaped the observation of previous investigations, is fairly constant, if not quite so evident as the upward movement. A not very distinct downward curl of the lips accompanies the straining of the forehead, corresponding to the upward curl accompanying the wrinkling of the forehead.

Having seen these facial reflexes associated with vertical nystagmus, it appeared to me reasonable to suppose that corresponding reflexes would be found along with horizontal nystagmus. Even before I found the above-mentioned forehead reflexes I had once or twice observed that during and after rotation in the horizontal plane it seemed as if one eye of the child became larger than the other. On turning my attention to the facial reflex associated with horizontal nystagmus, I observed that a contraction appeared in the cheek on the side to which the slow phase of the nystagmus was directed, both during and after rotation. If one, for instance, turns a child round to the right in the usual upright position, a rapid nystagmus phase to the right and a slow to the left will appear at the commencement of rotation, *vice versa* on stopping. During rotation, further, the left-hand corner of the mouth is drawn a little to

Vestibular Face Reflexes

the side and upwards, whilst the left palpebral fissure is somewhat enlarged. On stopping, exactly corresponding phenomena are observable, but to the right side. These last exactly as long as the eye movements continue. The mouth is sometimes drawn into a curious crooked position resembling the mouth of a flounder.

The reflex is, when once one is on the lookout for it, both distinct and quite constant, even if the rotation now and then has to be repeated in order to produce it. Sometimes it is only visible when the child yawns, on the other hand it disappears when the child screams; it would therefore seem that stronger and more spontaneous movements efface it. In accordance with this it disappears in older children. I have not up to now found it in infants over $1\frac{1}{2}$ months old. I have sought for it, but in vain, in adults suffering from central facial paresis; I had imagined that in such cases one could produce a vestibular facial contraction in analogy with the vestibular eye movements in cases of supranuclear paresis of the movements of the eye. On the other hand, I have found the vestibular cheek reflex in a remarkably perfect form in prematurely born infants at the seventh month. The reflex appears whether the child is awake or asleep. As a rule it can be produced by rotation not only in the horizontal but also in the frontal plane.

As the right labyrinth is irritated during rotation to the right (nystagmus to the right), while on stopping rotation the left labyrinth is affected (nystagmus to the left), and as the cheek reflex during rotation appears on the left, but on the right on stopping, it would seem to prove that the crossed connections of the labyrinth with the opposite side are the dominating ones—a relation which does not quite harmonise with other facts. Further inquiry, however, into the much debated question of the labyrinthine connection with homo-lateral or contra-lateral muscles is beyond the scope of the present paper.

It will, however, perhaps be of interest to try to explain how these reflexes arise. As regards the wrinkling of the forehead and lifting of the eyebrow which appear when the patient's head is bent forward, Bartels was of the opinion that they originated in the labyrinth. Bárány, who seems to have only investigated this reflex after rotation, supposed it to be vestibular, or rather he thought the phenomenon observed by Bartels to be the same

S. Mygind

as he himself observed. In this he is, however, not quite justified. When the reflex is produced by rotation, and when it accompanies a vertical nystagmus downwards (*i.e.* a slow phase upwards), there is, of course, no doubt that it is of vestibular origin. But Bartels, who made use of a simple bending forward movement, remarks emphatically that when the movement is performed sufficiently slowly no eye movements appear. That is right enough. It must also be pointed out that, whilst the forehead and eyelid reaction, which appears after rotation, is only of short duration, that which appears by a forward bending movement continues as long as the child's head remains in the same position, but with only an occasional relaxation. In this case, therefore, the reflex cannot have its rise in the cupula of the semi-circular canals, which must have been at rest for some time; it must be supposed to originate in the otolith organs if it is of aural origin.

The forehead- and eyelid-reflex, however, ought not to be considered as an isolated phenomenon. It is apparently a part of the greater reflex—the well-known and often very pronounced backward bend of the neck and head—which all infants exhibit when laid down on their stomachs. By placing one's fingers on the back of the new-born infant's neck, one finds that as the forehead-eyelid reflex becomes stronger or weaker the muscles of the back of the neck are either stretched or relaxed. To what extent this diffuse reflex is of vestibular origin can hardly be decided, so long as one has not had an opportunity of examining infants with extinct vestibular function. The vestibular genesis seems, however, to be less probable. If the reflex is considered as beginning as a proprioceptive innervation from the muscles and joints of the neck leading to the cerebellum, where connection is established with the efferent tracts, it will be easier to understand that only a forward bending movement gives rise to a reaction. The static system of the cerebellum is much better adapted to balance a fall forward than a fall backward. (We must remember the general forward moving tendency of the body.) This is not only proved by experiments, but in a recently published and most interesting treatise by Sven Ingvar (*Zür Phylo- und Onto-genese des Kleinhirns*, Haarlem, 1918, Erven Bohn), it is clearly demonstrated from the anatomical point of view. He shows that the proprioceptive tracts to the anterior basal part of the cerebellum (the absence

Vestibular Face Reflexes

of which cause a fall forward and whose function therefore is the regulation of backward movements) are very strongly developed, whilst on the contrary the corresponding tracts to the posterior basal part, which has the opposite function, are almost entirely wanting. The vestibular tracts, on the other hand, are equally developed to both parts. Vestibular irritation, in conformity with the above, gives not only eye movements but also head and facial movements in both upward and downward directions. It must, however, be remarked that the downward movements are not quite as marked as the upward. In the case of head movements this has already been remarked by Bárány. To this corresponds the circumstance that in adults the vertical nystagmus downwards (answering to the slow vestibular phase upwards) is not so marked nor of so long duration as the vertical nystagmus upwards. This difference is also found in newly-born infants, though in a lesser degree—on an average 8.6 seconds for nystagmus downwards, and 7.7 seconds for nystagmus upwards; for children between one and twelve months the figures are already higher, being 12 seconds and 10.6 seconds.

The result we arrive at is, then, that though the reflex observed by Bárány (after rotation) is doubtless vestibular, that observed by Bartels (by slow forward bending) is of different origin. The latter probably arises in the neck and is formed by the cerebellum. The reflex produced by quick forward bending of the head is a combination of both of the above.

As far as the cheek reflex is concerned, text-books on anatomy describe fibres, which *via* the posterior longitudinal bundle connect the vestibular with the facial nerve. We must, however, remember that the cheek reflex represents the so-called central facial nerve, as the muscle group which contracts is exactly that which becomes paralysed in a central facial paresis. That the other branches of the facial nerve are not affected either by vestibular irritation or by the pathological process (apoplexy) is due to the fact that their centres are bilateral, corresponding to the close connection between the functions of both sides of the face. It is, therefore, practically impossible that the upper centres of the facial nerve should be affected by a pathological process.

Although we know only central facial phenomena originating from the cerebrum, it is difficult to imagine that the vestibular

S. Mygind

cheek reflex is formed in this region. The tracts of other vestibular reflexes run, from all we know, below the cerebrum; this is the case even with the rapid phase of nystagmus, at all events in animals. Further, all doubt is out of the question as far as human beings are concerned, in regard to the slow phase of nystagmus. It is therefore probable that the cheek reflex, which corresponds to the slow phase, has a deep running reflex arc in the cerebellum. We know that the muscles of the whole body are widely represented here; amongst these we find certain facial elements, because derangements of speech may be caused by disease of the cerebellum, for instance tumours and disseminated sclerosis.

According to Bárány's theory, the muscular function of each joint is represented in the cerebellum at least four times, namely for the movement up, down, to the right and to the left. Ingvar imagines the cerebellum as containing large ring-shaped confluent centres, in which the direction of any movement whatever is represented by a corresponding meridian in the ring. If we accept either one or other of these two kindred theories, we should expect to find in the cerebellum centres of the facial nerve representing, like other centres here, not anatomical groups of muscles or peripheral nerves, but certain directions of movement, amongst others the upward and downward movements and those to the right and left as we have seen them in our rotation experiments. The centres for the upward movement may possibly act not only on vestibular irritation, but also under the influence of the neck reflexes, such as we have seen in infants when bent forward.

If the theory here put forward is correct, we must suppose that there is a distinction between the superior and the inferior facial nerve in the cerebellum as there is in the cerebrum. We may, therefore, suppose that a cerebellar trouble also might cause "central" symptoms, embracing only the facial nerve to the mouth. A true paresis would not of course appear, but perhaps an atony or an ataxy in this region, which might resemble a slight paresis. The phenomenon would in this case be on the same side as the trouble, in contradistinction to the crossed central facial paresis caused by cerebral disease.

The face reflex disappears soon after birth, corresponding to the increase of the development of the cortical cerebral tract. Its disappearance is perhaps dependent on the circumstance that it is useless for human beings, whereas the regulation of

Vestibular Face Reflexes

the eyes, trunk, and extremities from the vestibule, is important in the orientation of these parts of the body as to change of position.

As far as animals are concerned the author has only examined rabbits, which exhibit a very distinct mouth reflex, the upper lip moving vigorously from side to side in time with and in the same direction as the rapid phase of nystagmus. The movement is finely marked by the much increased oscillations of the hairs of the animal's whiskers. This reflex in rabbits is doubtless identical with the cheek reflex in new-born infants. Corresponding movements are also observable in the rabbit's eyebrows and eyelashes, but the author is unable to decide how much of this is due to the movements of the eyes (as seen in human beings), and how much to direct innervation of the facial nerve. The mouth reflex is probably preserved by animals, because it is of use to them, for they, unlike us who put our food decently into our mouth, seize their food with their mouth, moving both head and body to assist them. A uniform tonus of all the muscles in question is necessary for the intended action.

These experiments were carried out in the hospital departments of Professor Hauch and Professor Holger Mygind. The author wishes to thank both of these gentlemen very heartily for their kindness and assistance.

STATISTICAL TABLES FOR THE YEARS 1919 AND 1920

*From the Ear and Throat Department of the Royal Infirmary,
Edinburgh.*

By DRS TYRRELL PATTERSON, CECIL BURNHAM, and
G. EWART MARTIN, Clinical Assistants.

	1919. (1146)	1920. (1312)
AFFECTIONS OF THE NOSE.		
I. The External Nose and Nasal Vestibule.		
Nasal Deformity	1	2
Fracture of Nose	5	2
Injury to Nose	4	13
Collapse of Alæ Nasi	0	2
Dermatitis of Vestibule	40	38
Furuncle of Vestibule	5	2
Papilloma of Vestibule	1	0
Lupus of External Nose	4	4
Gumma of External Nose	1	0
Cyst (Sebaceous) of Vestibule	3	1
Rhinophyma	1	1
Broadening of External Nose (unknown cause)	2	0
	<hr/> 67	<hr/> 65
II. The Nasal Cavities.		
Deflection of Septum to Right	139	179
" " Left	166	190
Irregular Deflections	50	52
Hæmatoma and Abscess of Septum	1	2
Simple Ulcer of Septum	1	0
" Perforation of Septum	3	6
Perichondritis of Septum	1	0
Gunshot Wound of Septum	1	0
Acute, Subacute, and Chronic Rhinitis	96	107
Inferior Turbinal Enlargement	308	359
Polypoid Middle Turbinals and Nasal Polypi	98	102
Purulent Rhinitis	5	9
Fibrinous Rhinitis	2	7
Atrophic Rhinitis (Non-fetid)	18	16
" (Fætid)	28	31
Rhinitis Sicca	21	57
Epistaxis	31	28
Lupus of Nasal Mucous Membrane	12	4
Syphilitic (Tertiary) Disease of Nasal Cavities	18	5
Foreign Bodies in Nose	8	6
Rhinolith	0	1

Statistical Tables for 1919 and 1920

	1919.	1920.
Nasal Neurosis (including Asthma)	69	85
Abscess of Nose (Incisor Tooth)	0	1
Simple Tumour of Nose (Fibroma)	1	0
Malignant Tumour of Nose :—		
Sarcoma	1	0
Epithelioma	1	0
	<u>1079</u>	<u>1247</u>

	ACCESSORY NASAL SINUSES.	(61)	(77)
Acute Antral Catarrh	3	0	
" Suppuration (Orbital Abscess 1)	1	5	
Chronic Antral Catarrh	6	3	
" Suppuration (Unilateral)	19	29	
" " (Bilateral)	3	8	
Acute Frontal Sinus Catarrh	3	1	
Chronic Frontal Sinus Suppuration	3	0	
" Ethmoidal Suppuration	3	3	
" Sphenoidal Suppuration	1	1	
Acute Frontal, Ethmoidal, and Maxillary Suppuration	1	0	
Chronic Ethmoidal, and Maxillary Suppuration	1	8	
" Fronto-Ethmoidal Suppuration	1	1	
Chronic Frontal, Ethmoidal, and Maxillary Suppuration	2	2	
Pansinusitis	1	5	
Ethmoidal Mucocoele	0	1	
Naso-antral (Choanal) Polypi	9	8	
Dental Cyst, invading Antrum	3	2	
Foreign Body (Shrapnel) in Antrum	1	0	
	<u>61</u>	<u>77</u>	
DACRYOCYSTITIS	<u>30</u>	<u>31</u>	

DISEASES OF THE NASO-PHARYNX, PHARYNX, AND FAUCES.

	(1499)	(1643)
Adenoids and Enlarged Tonsils	1248	1406
Acute Tonsillitis	30	21
Peritonsillar Abscess	19	20
Ulcer (pneumococcal) of Tonsil	0	1
Malignant Disease of Tonsil	3	4
Tuberculous Disease of Tonsil	0	3
Calculus of Tonsil	1	1
Cyst of Tonsil	2	4
Diphtheria	4	5
Acute Pharyngitis	7	6
Chronic Pharyngitis (including Granular Pharyngitis)	51	53
Pharyngitis Sicca	16	14
Keratoses Pharyngis	2	3

T. Patterson, C. Burnham, & G. E. Martin

	1919.	1920.
Hypertrophy of Lingual Tonsil	6	10
Secondary Syphilis of Fauces and Pharynx	24	4
Tertiary " "	11	13
Malignant Tumours of Fauces and Pharynx	8	10
" " Nasopharynx (Sarcoma)	2	2
Tuberculous Ulcer of Pharynx	0	1
Lupus of Soft Palate and Pharynx	4	1
Tubercular Retropharyngeal Gland	1	0
Foreign Bodies in Fauces, Pharynx, Nasopharynx	21	8
Post-diphtheritic Paralysis of Soft Palate	1	3
Bifid Uvula	0	1
Enlargement and Œdema of Uvula	3	8
Sensory Neuroses	17	34
Vincent's Angina	11	5
Retropharyngeal Abscess	3	0
Congenital Occlusion of Choanæ	0	2
Thornwaldt's Disease	1	0
Nævus of Soft Palate	1	0
Papilloma of Palate	2	0
	<hr/> 1499	<hr/> 1643

DISEASES OF MOUTH.

	DISEASES OF MOUTH.	(20)	(30)
Cleft Palate	I	3
Superficial Glossitis	O	I
Leucoplakia	O	I
Tertiary Syphilis of Tongue, Mouth, and Palate .	.	8	5
Carcinoma of Tongue, Alveolus, and Palate .	.	5	8
Periodontal Abscess	O	I
Cartilaginous Growth on Roof of Mouth .	.	I	O
Ranula	I	O
Megaloglossia	I	O
Abscess and Cyst of Lower Lip	O	3
Lupus of Lip	I	O
Simple Tumour of Tongue	O	4
Cyst of Tongue	O	I
Injury to Mouth	I	I
Neurosis of Mouth	O	2
Congenital Insufficiency of Hard Palate .	.	I	O
		20	30

AFFECTIONS OF THE LARYNX AND TRACHEA. (161)

I. Acute.

Acute Catarrhal Laryngitis	.	.	.	.	13	9
Acute Edematous Laryngitis	.	.	.	.	2	3
					<hr/> 15	<hr/> 12

Statistical Tables for 1919 and 1920

II. Chronic.

	1919.	1920.
Chronic Catarrhal Laryngitis	24	40
Membranous Laryngitis	0	1
Laryngitis Sicca	14	12
Vocal Nodules	2	6
Pachydermia of Larynx	0	2
Tubercular Disease of Larynx	21	11
Lupus of Larynx	1	2
Syphilitic Disease of Larynx	7	7
	<u>69</u>	<u>81</u>

III. Tumours.

Simple :—		
Papilloma	1	1
Fibroma	3	0
Simple Tumour of Vocal Cord	0	1
Malignant :—		
Intrinsic	1	4
Extrinsic	4	7
	<u>9</u>	<u>13</u>

IV. Affections of Laryngeal Nerves.

Congenital Laryngeal Stridor	1	0
Functional Aphonia	9	12
Abductor Paralysis of R.V.C.	0	1
Recurrent Paralysis of R.V.C.	2	3
” ” of L.V.C.	8	10
Bilateral Abductor Paralysis	3	4
Sensory Laryngeal Neurosis	2	1
	<u>25</u>	<u>31</u>

V. Miscellaneous.

Ankylosis of R. Arytenoid Cartilage	0	1
” of L. ” ”	0	1
Post-diphtheritic Stenosis of Larynx	1	0
” Laryngeal Web	1	0
Congenital Defect of Larynx (Fissured Cords)	1	0
Foreign Bodies in Larynx	2	0
Simple and Exophthalmic Goitre	35	32
Thyroglossal Cyst	1	1
Cyst of Thyroid	2	0
	<u>43</u>	<u>35</u>

T. Patterson, C. Burnham, & G. E. Martin

AFFECTIONS OF HYPO-PHARYNX AND ŒSOPHAGUS.

	1919. (27)	1920. (49)
Stricture :—		
(a) Simple	2	8
(b) Malignant (including Post-cricoid Carcinoma) .	11	20
(c) Unknown cause	2	0
Neurosis of Hypo-pharynx and Œsophagus . . .	2	9
Foreign Bodies in Hypo-pharynx and Œsophagus (one in Bronchus)	9	10
Abscess of Œsophagus (secondary to foreign body) .	0	1
Specific Ulceration of Œsophagus	1	0
Simple Ulcer of Œsophagus (upper end)	0	1
	<u>27</u>	<u>49</u>

AFFECTIONS OF THE EAR. (1780) (1858)

I. The External Ear.

Congenital Malformation	0	1
Injury to External Ear	4	3
Cerumen	170	228
Furunculosis	52	56
Otitis Externa Diffusa	69	93
Exostosis	1	0
Hyperostosis	0	4
Fibro-cutaneous Stenosis of Auditory Meatus . .	1	0
Abscess of External Ear	2	3
Enchondroma	1	0
Erysipelas of Auricle	1	0
Foreign Bodies in Ear	8	9
Malignant Disease of External Ear	0	1
Specific Ulcer of External Ear	0	1
Suppurating Mastoid Gland	2	8
Keratosis Obturans	1	0
Sebaceous Cyst	2	9
Aural Neurosis	9	8
	<u>323</u>	<u>424</u>

II. The Middle Ear Cleft.

Eustachian Obstruction	117	183
Acute Non-suppurative Otitis Media	78	69
Chronic " "	98	111
Acute Suppurative Otitis Media :—		
Right	49	47
Left	54	40
Bilateral	14	6

Statistical Tables for 1919, and 1920

	1919.	1920.
Chronic Suppurative Otitis Media :—		
Right	172	146
Left	142	188
Bilateral	128	119
Sequelæ of Chronic Suppurative Otitis Media :—		
Right	75	91
Left	76	62
Bilateral	88	50
Acute Suppurative Otitis Media with Mastoid Com- plication :—		
Right	23	19
Left	15	19
Bilateral	1	1
Chronic Suppurative Otitis Media with Mastoid Com- plication :—		
Right	38	29
Left	32	20
Bilateral	1	2
Tubercular Otitis Media :—		
Right	1	2
Left	1	1
Bilateral	1	2
	<u>1204</u>	<u>1207</u>

III.

Otosclerosis	70	56
Mixed Middle and Inner Ear Deafness	41	34
	<u>111</u>	<u>90</u>

IV. Internal Ear Affections.

Congenital (including deaf-mutism)	13	8
Traumatic (following shell explosion)	25	12
„ (following injury other than shell explosion)	4	4
Occupational	7	10
Functional	1	1
Senile Changes	8	19
Circumscribed Labyrinthitis	1	2
Serous Labyrinthitis	1	0
Acute Purulent Labyrinthitis	0	1
Latent Labyrinthitis	3	1
Congenital Syphilis	6	14
Acquired Syphilis	4	9
Unknown Causes of Nerve Deafness	67	41
Nerve Deafness due to Toxæmia	0	13
Cerebello Pontine Tumour and Tumour of Eighth Nerve	2	2
	<u>142</u>	<u>137</u>

T. Patterson, C. Burnham, & G. E. Martin

INTRACRANIAL COMPLICATIONS OF SUPPURATIVE OTITIS MEDIA.

	1919. (11)	1920. (15)
1919. <i>Five</i> cases complicating Acute Otitis Media		
Suppurativa :—		
Extra-dural Abscess in Middle and Posterior		
Fossæ (R. ear)	1	...
Peri-sinus Abscess (L. ear)	1	...
Sinus Thrombosis (L. ear)	1	...
„ and Suppurative Meningitis		
(L. ear)	1	...
Septicæmia (R. ear)	1	...
Recoveries : 3.—2 Cases of Extra-dural Abscess.		
1 case of Sinus Thrombosis.		
Deaths : 2.—1 Sinus Thrombosis and Meningitis.		
1 Septicæmia.		
<i>Six</i> cases complicating Chronic Otitis Media		
Suppurativa :—		
Labyrinth Disease and Sinus Thrombosis		
(L. ear)	1	...
Temporo-sphenoidal Abscess and Purulent		
Meningitis (R. ear)	1	...
Temporo-sphenoidal Abscess (ruptured) and		
Meningitis (R. ear)	1	...
Perisinus Abscess, Sinus Thrombosis, and		
Cerebellar Abscess (R. ear)	1	...
Sigmoid Sinus Thrombosis and Septic		
Pneumonia (L. ear)	1	...
Purulent Meningitis (R. ear)	1	...
Recoveries : 2.—1 Sinus Thrombosis (uncomplicated).		
1 „ and Cere-		
bellar Abscess.		
Deaths : 4.—The remaining above cases.		
	—	
	11	
	—	
1920. <i>Four</i> cases complicating Acute Otitis Media		
Suppurativa :—		
Acute Purulent Lepto-meningitis (L. ear 2,		
R. ear 1) . . . . .	...	3
Temporo-sphenoidal Abscess (R. ear) . . . . .	...	1
Recoveries.—1 case of Lepto-meningitis.		
Deaths : 3.—2 cases „		
1 Temporo-sphenoidal Abscess.		
<i>Eleven</i> cases complicating Chronic Otitis Media		
Suppurativa :—		
Cerebellar Abscess (R. ear) . . . . .	...	1
„ „ and Extra-dural Abscess		
(L. ear) . . . . .	...	1

Statistical Tables for 1919 and 1920

	1919.	1920.
Perisinus Abscess, Sinus Thrombosis, Cerebellar Abscess, and Hernia (R. ear)	...	1
Perisinus Abscess (L. ear)	...	1
Acute Purulent Lepto-meningitis (bilateral 2, R. ear 1)	...	3
Temporo-sphenoidal Abscess (L. ear)	...	1
Lateral Sinus Thrombosis (R. ear)	...	1
Extra-dural Abscess, Temporo-sphenoidal Abscess, and Lepto-meningitis (L. ear)	...	1
Streptococcal Septicæmia (R. ear)	...	1
		<hr/> 15
Recoveries : 4.—2 cases Cerebellar Abscess. 1 case Temporo-sphenoidal Abscess. 1 „ Perisinus Abscess.		
Deaths : 7.—1 case Sinus Thrombosis. 3 cases Lepto-meningitis. 1 case Temporo-sphenoidal Abscess. 1 „ Cerebellar Abscess. 1 „ Septicæmia.		

MISCELLANEOUS CASES. (127) (183)

These include cases sent from other wards in the hospital with negative findings, enlarged cervical glands, skin diseases, headaches of unknown origin, mental defects, eye cases, etc.	127	183
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TABLE OF OPERATIONS.

The Nose.

Fracture of Nasal Bones (rectified)	2	3
Nasal Spur removed	2	0
Hæmatoma of Nasal Septum	0	2
Abscess of Nasal Septum	0	1
Submucous Resection of Septum	166	147
Turbinotomy	91	100
Nasal Polypi (including return cases)	129	149
Curetting (for Lupus)	9	4
Foreign Bodies removed from Nose	7	5
Fibroma removed	1	0
Sequestrum removed	1	0
Wart removed	1	0
Shrapnel removed from Septum	1	0
Radical Operation for removal of Malignant Tumour	2	0
Injection of Paraffin	1	0
Intra-nasal Dacryocystotomy (West's Operation)	21	25
Nasal Cauctery	57	70
Choanal Atresia	0	1
	<hr/> 491	<hr/> 507

T. Patterson, C. Burnham, & G. E. Martin

	Accessory	Nasal	Sinuses.	1919.	1920.
Proof Puncture of Antrum	.	.	.	111	105
Intra-nasal Operation on Antrum	.	.	.	6	9
Radical	"	"	.	16	38
Naso-antral Polypi (Radical Operation on Antrum)	.	.	.	6	5
Dental Cyst invading Antrum	.	.	.	3	2
Intra-nasal Operation on Frontal Sinus	.	.	.	2	0
Radical	"	"	"	1	3
Operation on Ethmoid Cells (intra-nasal)	.	.	.	6	12
" on Ethmoidal Mucocele	.	.	.	1	0
" on Sphenoidal Sinus	.	.	.	1	1
Sequestrum	.	.	.	0	2
				<hr/> 153	<hr/> 177

Mouth and Pharynx.

Tonsils and Adenoids removed (Guillotine and Curette)	1095	1182
Tonsils dissected out (Scissors and Snare)	35	47
Peritonsillar Abscess opened	22	14
Retropharyngeal Abscess opened	2	0
Curetting of Palate for Lupus	3	2
" of Lip "	1	0
Papilloma of Palate removed	1	0
" of Uvula "	0	1
Tissue removed from Nasopharynx (malignant)	2	2
Thyroglossal Cyst removed	1	1
Cyst of Lower Jaw removed	0	1
Radium applied to Malignant Growth	1	0
	<hr/> 1163	<hr/> 1250

Larynx, Trachea, and Œsophagus.

Suspension Laryngoscopy (examination)	13	11
" " with Operation :—		
Papilloma removed	3	1
Lupus curetted	3	1
Simple Tumour removed from V. Cord	1	0
Epiglottis partly removed	0	2
Aryepiglottic fold incised	0	3
Foreign Body removed	1	0
Esophagoscopy (examination)	14	21
" (remove of foreign body)	6	15
Direct Laryngoscopy	0	5
Bronchoscopy	2	4
Tracheotomy	3	5
Thyrotomy	1	3
	<hr/>	<hr/>
	47	71

Statistical Tables for 1919 and 1920

The Ear.					1919.	1920.
Furunculosis opened	.	.	.	.	8	10
Exostosis	.	.	.	.	0	1
Paracentesis	.	.	.	.	26	30
Ear Granulations curetted	.	.	.	.	3	0
Tumour of External Meatus	.	.	.	.	1	0
Sebaceous Cyst of Auricle	.	.	.	.	1	1
Aural Polypi removed	.	.	.	.	15	26
Plastic Operation	.	.	.	.	5	10
„ „ for Stenosis of Auditory Meatus	.	.	.	.	1	0
Glandular Abscess over Mastoid	.	.	.	.	3	17
Foreign Bodies removed from Ear	.	.	.	.	6	2
Schwartz Operation on Mastoid	.	.	.	.	42	39
Modified Radical Operation	.	.	.	.	13	12
Radical Mastoid „	.	.	.	.	61	85
Operations on Labyrinth	.	.	.	.	1	2
Extra-dural Abscess	.	.	.	.	4	1
Sigmoid Sinus opened	.	.	.	.	6	5
Cerebellar Abscess	.	.	.	.	1	3
Temporo-sphenoidal Abscess opened	.	.	.	.	2	1
Internal Jugular Vein ligatured	.	.	.	.	5	1
Cerebellar Decompression	.	.	.	.	0	1
„ Exploration	.	.	.	.	0	1
					<u>204</u>	<u>248</u>
Intravenous Injection Novarsinobillon	.	.	.	.	<u>14</u>	<u>0</u>
Anæsthetics Administered.						
Ethyl Chloride	.	.	.	.	1102	1227
Chloroform	.	.	.	.	32	56
Chloroform followed by Ether	.	.	.	.	187	282
Local Anæsthesia	.	.	.	.	526	612
					<u>1847</u>	<u>2177</u>
Number of new patients attending the Department	.	.	.	.	<u>3488</u>	<u>3715</u>

CLINICAL RECORDS

CHONDROMA OF THE CRICOID.

By E. B. WAGGETT, D.S.O., M.B., B.C., Surgeon, Diseases of the Throat and Ear, Charing Cross Hospital, London.

IN July 1919, Dr J. R. Whait brought to me for consultation a gentleman, aged 55, whom he had known intimately for many years and in whose history there was nothing to suggest the likelihood of syphilis. The patient, an exceedingly thin but otherwise healthy man, was breathing with some little difficulty; his voice was weak and the scar of a closed tracheotomy wound was present.

Dr Whait had already made the diagnosis of benign tumour of the larynx, which proved to be correct.

At the level of the cricoid, on the right side externally, a small, firm, fixed nodule was to be felt. The mirror showed the right side of the laryngeal vestibule to be occupied by a large, rounded swelling. This was smooth and covered with normal mucous membrane. It had the appearance of a cyst distending the right ventricle of Morgagni, but proved on probing to be of firm consistence. The right arytenoid was immobile, and all but the extreme anterior and posterior portions of the right vocal cord were hidden by the tumour. A smaller rounded body was with difficulty seen below the level of the glottis on the right side.

There was marked abductor paresis of the left vocal cord which, on inspiration, scarcely reached the cadaveric position, leaving little enough room for breathing.

A lateral stereoscopic skiagram by Mr Coldwell showed a hemispherical shadow occupying the entire right side of the larynx, merging into that of the cricoid plate and embraced by that of the cricoid ring. The shadow of the right arytenoid was seen distinct from it and perched upon its postero-superior pole. From below the main shadow a "tail" with a well-defined curved anterior edge swept down into the trachea for some two inches, narrowing off inferiorly to merge into the shadow of the posterior tracheal wall.

The diagnosis was made of chondroma, or dense fibroma pressing upon the left as well as the right recurrent nerve.

A few days later I was compelled to reopen the tracheotomy

Chondroma of the Cricoid

wound. The nature of the case, chondroma, was then evident, for the tumour extended down the posterior tracheal wall to the level of the wound and could readily be palpated.

The patient had to leave England to resume his consular duties in Spain, arranging to return for operation six months later.

In view of the diagnosis in future instances, the remarkable history of this case is worth following in detail. It has had to be culled from various sources, as Lt.-Col. Whait and myself were abroad together throughout the early course of the disease, which coincides with the period of the war.

In August 1914, the patient began to experience failure of voice and a sense of constriction. Previous to this, in the spring of 1914, he had had pain in the left ear and an "ulcer, low down" with dysphagia.

In December 1914, the "right vocal cord was not working and the movements of the left were impaired." Tracheotomy was contemplated. X-ray was "negative." There is an ill-defined report of an ulcer, but no evidence that an ulcer was observed. Several of his medical advisers in Spain diagnosed syphilis and administered anti-specifics.

In April 1915, Sir Charters Symonds saw him and I append his note. "Right vocal cord fixed. The arytenoid curiously shaped and crooked. Pyriform space very large and flat. Left vocal cord does not move well. Glottis small. Aryepiglottic fold seems stretched, as if there was some contraction. Both cords clear. No growth was seen inside larynx; nothing felt outside. No dysphagia. No aneurysm. Possibility of ataxia. May 10, 1915: much the same. R.V.C. fixed. Very little movement of L.V.C. I note a depression in the left arytenoid into which fits the cartilage of the right side. Both cords clear. No infiltration seen, though left arytenoid looks a little puffy and red—contact (?) with right." Salvarsan was given.

September 1915.—Left cord again moving. In October 1915, Dr Watson Williams saw him and made a drawing showing the right arytenoid dragged or pushed over beyond the middle line. The left vocal cord was also almost completely fixed in the cadaveric position. He diagnosed cicatricial deformity, and employed radium, intra- and extra-laryngeally. Wassermann was positive: mercury, iodide, and arsenic were exhibited. In December 1915, improvement was evident. The right vocal cord was now in the middle line on inspiration, and adducted to the left vocal cord on phonation. Left vocal cord in cadaveric position. The definite evidence of fullness in the right arytenoid region had disappeared, and the twisted appearance of the

E. B. Waggett

glottis no longer existed. It is important to note that radium as well as antispecifics were employed.*

A year later, October 1916, during a catarrh, tracheotomy had to be performed in haste.

In January 1917, a Spanish physician said something about "a small tumour." Using a valved tracheotomy tube, the voice was fairly good. Antispecifics were employed from time to time. Wassermann reaction seems to have varied. In June 1918, the tracheotomy wound was closed, but the patient was never very comfortable in breathing. In September 1918, the voice was very weak "owing to recrudescence preventing the right vocal cord from working well." In July 1919, I saw him for the first time, the right side of the larynx being quite fixed and occupied by a rounded tumour; the left vocal cord was in a condition of abductor paresis. In August 1919, I had to reopen the trachea.

When the patient returned to England in February 1920, the tumour had increased remarkably in size. The larynx was now almost completely filled by it, and a large rounded eminence was seen elevating the floor of the right pyriform fossa. The posterior portion of the tumour pressed against the posterior pharyngeal wall and interfered with deglutition. The left arytenoid adducted on retching, but not on attempted phonation. The lower end of the tumour pressed upon the tracheotomy tube. A mammillated tumour the size of a large walnut was to be felt in the right neck at the cricoid level. No palpable glands were present (Fig. 1).

I decided to shell out the tumour by submucous resection through a lateral external incision. Dr Bernard Potter administered intra-tracheal ether by tracheotomy fistula. Dr Whait and Mr E. D. Davis assisted at the operation.

After dissection of the muscles, ligature of the superior thyroid vessels, and displacement of the right thyroid lobe, the bluish-white, semitransparent, mammillated tumour was seen to be completely encapsuled. It was of the size of a large tangerine orange, extending from contact with the posterior pharyngeal wall to the anterior limit of the cricoid. No trace of the cricoid ring could be detected upon its surface, but a deep, vertical groove containing the much stretched recurrent nerve divided the outer surface into two unequal areas, the anterior being the larger. The tumour bulged from under the edge of the right thyroid ala without invading that cartilage. After dissection and elevation of the recurrent nerve and resection of the inferior cornu of the thyroid cartilage, the submucous resection of the tumour appeared to be quite easy but for the fact that I had no forceps large

* I am much indebted to Sir Charters Symonds and to Dr Watson Williams for kindly allowing me to make use of their notes.

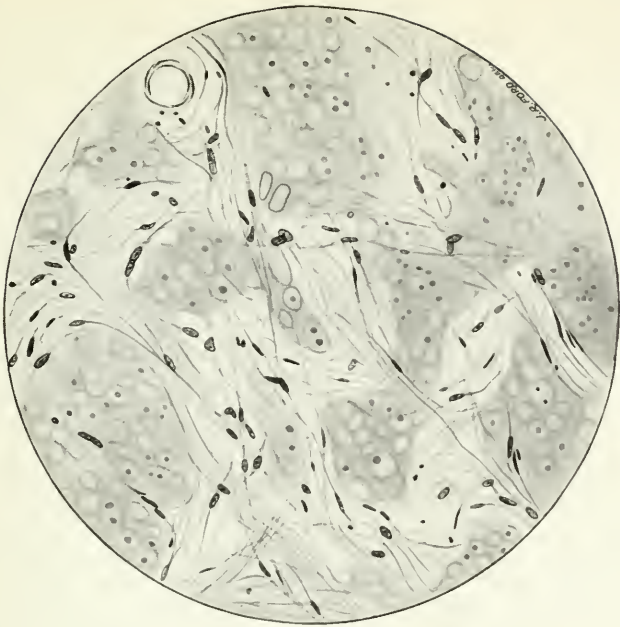


FIG. 2.—Portion of the Chondromyxomatous area of the tumour, and the manner in which the mucous and cartilaginous parts merge into one another: in the mucous portion are one or two capillaries. $\frac{3}{8}$ objective.

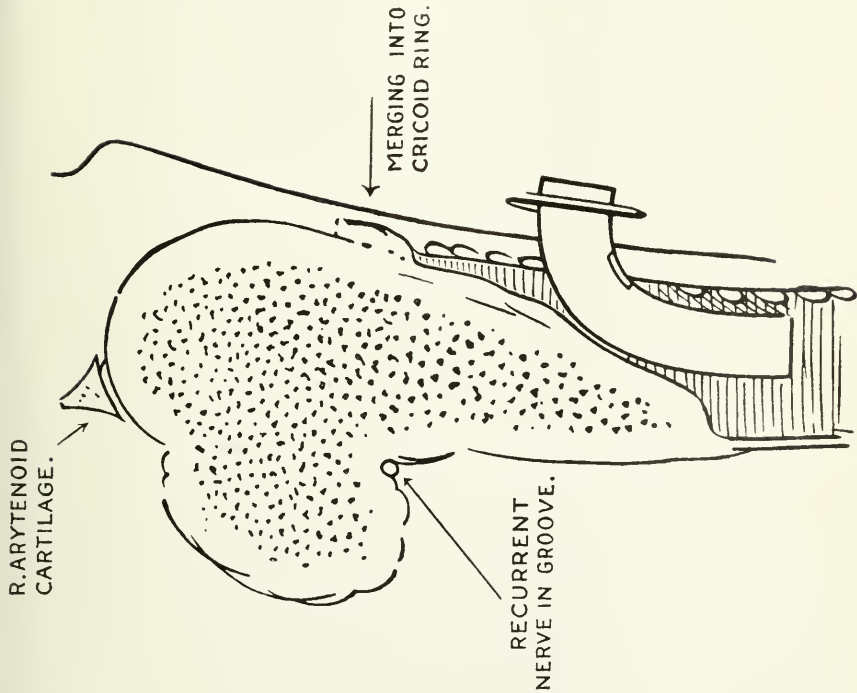


FIG. 1.—Antero-posterior Section. Reconstructed, natural size.

Chondroma of the Cricoid

enough to seize it. As it appeared to be extremely firm in consistence, in order to create a handle I forced a pointed instrument into its substance; whereupon the shell of the tumour, some half an inch thick, broke away, revealing a central mass resembling sago pudding in appearance and consistence. The necessity of clearing this out with a spoon has spoiled the specimen, which is now in the Royal College of Surgeons Museum. The intralaryngeal and intratracheal sections of the shell were then resected submucously without much difficulty—only one small tear being made into the lumen of the larynx. When the resection had been completed, all that remained of the cricoid was the anterior and left bow of the ring and the left edge of the plate. The very large operation cavity was bounded by a fibrous capsule resembling surgical gauze in appearance, with the triangular inferior aspect of the uninvaded right arytenoid and the remains of the right vocal cord visible on its surface. The left arytenoid could be felt but not seen. I am not certain of the condition of the tracheal rings as I had avoided exposing them externally. There was nothing to indicate their involvement in the growth.

Hæmorrhage was insignificant throughout, and the small subglottic tear in the capsule was sutured at once; nevertheless a mild sepsis occurred in the operation cavity. The latter was packed with gauze, pending the pathological report and the possible need for radium treatment.

Recovery was uneventful, and by the fifth day the capsule, part of which had been stitched to the sternomastoid with the object of leaving a clear airway in the larynx, had begun to retract towards that muscle.

By the twenty-first day the left vocal cord was moving actively and was normal in colour.

A month after the operation the mucosa had shrunk back on the right side to the semblance of an irregular but fixed vocal cord. The left cord showed very fair abduction and vocalisation was good. I learn that for nearly a year the patient has had an excellent voice and has been able to walk uphill without a tracheotomy tube.

Professor Shattock reports on the tumour as follows:—

A large chondroma which grew from the right half of the cricoid cartilage. It comprises two spheroidal portions, of which the lower is a firm mass, 4 cm. ($1\frac{1}{2}$ inches) in diameter, invested with a "capsule" of perichondrium, beneath which chondrification is proceeding; the upper portion had undergone extensive mucinoid degeneration, and is now represented by the firmer periphery which was broken in the process of removal, and of which the fragments have been arranged upon a bead of glass.

E. B. Waggett

In the body the two were continuous; that in which softening had taken place projected into the laryngeal cavity, which, however, was not perforated either by the growth or during the operation. The other of the two portions projected from the outer aspect of the larynx, and was grooved for the recurrent laryngeal nerve.

The cartilaginous nature of the tumour is obvious to the naked eye, as well as an internal lobulation or subdivision such as is presented by chondromata in general.

Histology.—Two series of sections were made: one to include the free surface; the other, from a softer focus exposed in the interior on completely bisecting the undegenerate moiety of the growth.

Microscopically, the neoplasm is a chondroma with a small admixture of mucous tissue. As displayed in the first series of sections, it consists of minute lobules of hyaline cartilage held together by delicate vascular septa of connective tissue. The free surface is invested with a fibrous perichondrium, beneath which there is a growing zone of cells, around which the formation of a cartilaginous matrix is proceeding (Fig. 2).

In the septa there are small isolated groups of cartilage cells, as well as extensions from the borders of the lobules bounding the same septa. The growth is thus proceeding interstitially as well as subperichondrially.

The septa are in different degrees pervaded by sharply defined, patulous, tubular channels lined with endothelium, the contents of which show that they are blood capillaries.

In the more fully developed parts of the lobules there occur foci of mucinoid degeneration in which the cells have disappeared; a process whereby the matrix becomes granular and liquefies, leading to the formation of irregular, ill-defined, sometimes coarsely vacuolated spaces, devoid of any kind of cell lining.

In order to ascertain whether there was possibly a sarcomatous focus in the tumour, the chief mass was bisected. Not far from the centre a more translucent, softer area was disclosed. Here the structure proved to be chondromyxomatous, the cartilage being arranged in trabeculae and the spaces occupied by mucous tissue, the one structure merging into the other. Although actively growing, there is no histological reason for regarding any part of the neoplasm as sarcomatous, for the reason that it is nowhere purely cellular, chondrification taking place around the cells as quickly as they develop.

ENCEPHALITIS LETHARGICA, COMPLICATED BY DOUBLE CHRONIC SUPPURATIVE OTITIS MEDIA.

By JAMES DON, M.D., Aural Surgeon, and H. R. SOUPER, M.A.,
M.D., Senior Medical Officer, Ministry of Pensions Hospital,
Newcastle-on-Tyne.

THE following case presented such an unusual complication of diseases, and the accurate diagnosis was a matter of such doubt, that it is considered worthy of record.

Pensioner A. B., aged 32, was transferred on the 3rd January 1921, without diagnosis, from the Royal Victoria Infirmary, Newcastle, where he had been admitted on the previous day, to the Ministry of Pensions Hospital, where he was admitted to a medical ward. On the following day he was transferred to the aural ward with the tentative diagnosis of acute mastoiditis with possible cerebral involvement, supervening upon an old chronic suppurative otitis media.

The history subsequently given by the relatives was that he had been ill—apparently constantly comatose—for about three weeks: had had recurring aural discharge from both ears for many years, and had been discharged from the Army on account of “ear trouble.”

Condition on Admission to the Aural Ward—General condition very drowsy and apathetic, almost comatose, but he answers shouted questions after an appreciable interval; speech indistinct, and mentality confused. Pulse 76, temperature 102. Urine normal. No vomiting. No history of rigors. No signs of meningeal irritation. **Mouth and Pharynx:** septic stomatitis, and much muco-purulent post-nasal discharge. **Nose:** subacute rhinitis. Septum deviated to left—non-obstructive; marked fleshy hypertrophy of both inferior turbinals.

Ears: *Right*—Definite mastoid tenderness, no cedema. Old scars on the membrane. No actual purulent discharge at present, but meatus full of foul debris. No sagging of meatal wall. *Left*—Large postero-superior perforation. Profuse purulent discharge. No mastoid tenderness. Hearing could not be tested owing to his mental state.

Nervous system generally: no nystagmus. Apparent vertigo—states he is very dizzy, but is unable to sit up in bed to test this. There appears to be some undue rigidity of the neck muscles, but this is rather doubtful. No dysidiadokokinesia. Reflexes and pupils normal.

James Don and H. R. Souper

5th January.—Temperature 99. Operation by Dr Don: right radical mastoid. Granulations and debris in tympanum—very foul-smelling: lateral sinus exposed—no thrombosis, but granulations present on its surface. Cavity bipped, and packed through meatus with bipped gauze. Patient stood operation well. Condition remained practically unchanged during the next four days. No development in the left ear. No rigors, and temperature only slightly elevated in the evenings. Marked constipation.

10th January.—Knee jerks, and plantar, abdominal and epigastric reflexes absent. No Kernig's or other sign of meningeal irritation. Pupils react normally—no ophthalmoplegia—no ptosis—no nystagmus. No signs of complications in the left ear. Lumbar puncture performed, and 9 c.c. of clear cerebro-spinal fluid drawn off under slightly increased pressure: this was examined by Dr P. C. W. Laws, O.B.E., Bacteriologist to the Hospital, who reported "Culture sterile: a few lymphocytes present: no tubercle bacilli detected."

11th January.—Condition unchanged. Optic discs examined and found normal. Urine normal. Patient still able to answer shouted questions, though very slowly. On being asked if his sight was all right he stated he saw double, but owing to his lack of concentration it was impossible accurately to test or locate the diplopia, speech becoming slower and more unintelligible. Patient is much thinner since admission, but continues to take fluids well.

In default of more definite diagnostic symptoms, the tentative diagnosis was made of encephalitis lethargica. Urotropin in 10-grain doses was given thrice daily.

13th January.—Plantar reflexes now present and flexor in type. Abdominal, epigastric, and cremasteric reflexes present. Knee and ankle jerks could not be elicited; no other changes. General condition brighter.

17th January.—Much more lethargic during past forty-eight hours. For past twenty-four hours he has had incontinence of urine.

22nd January.—General condition unchanged. Pupils unequal, left larger than right: both react to light. During the next few days he slowly improved. Constipation persisted, but incontinence of urine disappeared. The general appearance became altogether healthier and more intelligent, and he began to take food well.

10th February.—Knee jerks now present. Pupils still slightly unequal, left larger than right—reactions normal. Diplopia absent. He is altogether brighter and more sensible, and able to get up. His only complaint is neuralgic pain—in no definite nerve distribution—in the right shoulder and arm. Mastoid cavity is satisfactory, and suppuration in the left ear is much diminished.

12th February.—Patient discharged from hospital feeling very well.

Encephalitis Lethargica

4th March.—Seen as an out-patient at the Aural Clinic. Condition very satisfactory: his only complaint is the persistence of neuralgia. Mastoid cavity dry, and left ear improved.

On surveying the whole case, we think there can be little doubt that the condition from the start was one of encephalitis lethargica. Had the aural condition not been present we should probably have arrived at that diagnosis—in the absence of anything more certain—earlier in the case; but the otitis media was a complication which undoubtedly, and with some justification, demanded our first attention. Whether the performance of the mastoid operation had any influence on the subsequent progress it is impossible to state; at all events, it led to no immediate improvement. But we maintain that the operation was in itself necessary on account of the signs present, and was amply justified by the state of chronic sepsis revealed in the tympanum and antrum.

Apart from operation and the treatment of the aural condition, the only active treatment was the administration of urotropin, which was continued till the patient's discharge from hospital. This is recommended in cases of encephalitis lethargica, but whether it had any influence on the recovery of the case we are unable to state. The lumbar puncture was performed solely as a diagnostic, not as a therapeutic measure. The Memorandum of the Ministry of Health on Encephalitis Lethargica, since received, states that in many instances "transient or permanent relief, with diminution of stupor, follows on the withdrawal of cerebro-spinal fluid by lumbar puncture." In our case no immediate improvement followed; had such occurred we should certainly have repeated the procedure.

We are indebted to Colonel F. J. Greig, C.M.G., A.M.S.(R.), Medical Superintendent of the Hospital, for permission to publish the record of the case.

SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

June 25, 1920.

Mr MARK HOVELL (*Vice-President*) in the Chair.

Supraglottic Tumour of Larynx—Dr A. L. MACLEOD.—Man, aged 57, complained of difficulty of swallowing for two months. Very ill on admission to hospital. Right side of larynx hidden by a supraglottic swelling. W.R. positive. Sudden death. P.M. revealed general syphilis, two aneurisms of aorta and a carcinoma, slightly pedunculated, attached to right aryepiglottic fold.

Tumour of External Nose: Adenoma of Lachrymal Duct—Mr H. L. WHALE.—A smooth, elastic tumour, the size of a duck's egg, which grew from nasal bridge. Enucleated in capsule and proved to be adenoma undergoing mucoid degeneration.

Hoarseness in a Man, aged 36—Dr W. H. KELSON.—Duration two years. Cords congested but move well. Inter-arytenoid thickening. No T.B. in sputum.

Dr WATSON WILLIAMS and Mr TILLEY suggested that the nasal sinuses should be explored.

Nasal Deformities treated by Transplantation of Costal Cartilage—Dr DOUGLAS GUTHRIE.—Photographs of three cases were shown, the deformity in each being caused by injury.

Dr LE MAITRE preferred bone to cartilage, and operated under local anæsthesia.

Dr DAN M'KENZIE emphasised the importance of early treatment in fractures of the nose.

Congenital Deformity of the Œsophagus—Mr W. APPELYARD.—Post-mortem specimen from an infant 16 days old. Only a pinhole orifice between upper and lower ends of œsophagus. Also fistulous communication with trachea.

Intranasal Dacryocystotomy as a Help in Atrophic Rhinitis—Mr H. A. KISCH.—The object of the procedure is to utilise the lachrymal secretion to moisten the nasal mucosa.

Sarcoma of the Nares (originating from Left Inferior Turbinal)—Mr TILLEY.—Male, aged 56. A reddish, nodulated mass, bleeding freely when probed. The tumour was removed fourteen years ago. No recurrence.

Royal Society of Medicine

Cavernous Angioma of Larynx—MR NORMAN PATTERSON and MR PIKE (see *Journal of Laryngology and Otology*, February 1921).

Intrinsic Cancer of Larynx after Laryngo-fissure (Five Cases)—Sir ST CLAIR THOMSON.—No recurrence of the disease had taken place in these cases, 7, 5½, 3, 3, and 2 years respectively after operation.

Extrinsic Cancer of Larynx, Male, aged 61, Six Years after External Operation through Side of Neck—MR WILFRED TROTTER and Sir ST CLAIR THOMSON.—Disease limited to left ary-epiglottic fold; the cervical glands (left) were removed at a preliminary operation. Left ala of thyroid cartilage removed.

Pemphigus of Mouth, Fauces, and Epiglottis in an Elderly Man—Sir J. DUNDAS-GRANT.—The formation of bullæ was observed taking from three to five days and subsiding in seven to ten days.

SECTION OF LARYNGOLOGY

SECOND ANNUAL SUMMER CONGRESS.

June 24 and 25, 1920.

MR MARK HOVELL (*Vice-President*) in the Chair.

Total Laryngectomy—Sir CHARTERS SYMONDS (published *Journal of Laryngology*, 1920, p. 257).

Sir CHARTERS SYMONDS thought it better to avoid tracheotomy.

Sir ROBERT WOODS related his experiences of twenty-five laryngectomies. He made a practice of stitching the wound, avoiding packs, and draining the pharynx by a tube alongside the feeding-tube. Preliminary use of atropine was essential. Fixation of the cord was an indication for laryngectomy, in preference to thyrotomy.

Sir WILLIAM MILLIGAN had removed the larynx in eleven cases. The operation was comparatively simple, but the details of after-treatment were very important. In all cases the patient should be examined with the œsophagoscope before operation. The complication to be feared was not septic pneumonia, but acute œdema of the lungs.

Dr LE MAITRE favoured preliminary tracheotomy, two or three weeks beforehand, and preferred local to general anæsthesia.

Sir JAMES DUNDAS-GRANT said that before performing thyrotomy for cancer, one should obtain the permission of the patient to carry out complete laryngectomy if necessary.

Lateral Pharyngotomy for Large Epilaryngeal Growths—MR WILFRED TROTTER (published *Journal of Laryngology*, 1920, p. 289).—In reply to several members, Mr Trotter stated that the

Societies' Proceedings

introduction of radium immediately after operation favoured sepsis and sloughing. A small communication between trachea and pharynx should be maintained, and should be high up under the tongue; thus, a voice may become possible and yet food will not enter the trachea. For growths of the pyriform sinus, lower lateral pharyngotomy is adequate.

Carcinoma of the Post-Cricoid Region and Upper End of Œsophagus—Dr A. LOGAN TURNER (published in *Journal of Laryngology*, 1920, p. 34).—Various facts regarding the sex and age incidence, the duration of the symptoms, and the suitability for operation, were illustrated by drawings and statistical tables. The existence of a pre-cancerous stage of the disease and the importance of early diagnosis was emphasised by several speakers.

Impaired Mobility of the Cord in Cancer of the Larynx—Sir ST CLAIR THOMSON (published in *The Lancet*, cxcix., p. 183).

Sir ST CLAIR THOMSON pointed out that this sign was present only in a proportion of cases (27 out of 44). When present it was a valuable indication of malignancy, and prognosis was in such cases unfavourable.

Œsophageal Obstruction due to Hypertrophy of the Cardiac Sphincter and Narrowing of the Epicardia—Dr A. BROWN KELLY (published in *Proceedings of the Royal Society of Medicine*, 1920, vol. xiii., p. 206).

In reply to inquiries by several members, Dr KELLY stated that he recommended early gastrostomy. This might throw light on the gastric condition causing the spasm. The cause of the condition would not be clear until we knew more about the physiology of the esophagus.

Some Practical Points in the Removal of Foreign Bodies from the Food and Air Passages (Fifty-one Cases)—Sir WM. MILLIGAN (Paper and Discussion *in extenso* in the *Proceedings of the Royal Society of Medicine*, Vol. xii., No. 9, July 1920).

The paper was discussed by Mr TILLEY, Dr PATERSON, Dr MOORE, and others, while Sir ST CLAIR THOMSON gave an account of a recent visit to the clinic of Chevalier Jackson.

The following papers were also read:—

Latent Sinusitis in Children—Dr P. Watson Williams.

Per Nasal Dacryocystotomy—Mr Lawson Whale (*British Medical Journal*, 6th November 1920).

Angioma of the Larynx—Dr Irwin Moore (*Journal of Laryngology*, January and February 1921).

Tonsillectomy for Rheumatoid Arthritis—Mr W. M. Mollison (*Journal of Laryngology*, April 1921).

Royal Society of Medicine

SECTION OF OTOTOLOGY.

May 21, 1920.

President—Mr HERBERT TILLEY.

ABRIDGED REPORT.

Acute Mastoiditis from Chronic Maxillary Antral Empyema; Immediate Closure of Wound after Application of B.I.P.—THE PRESIDENT.—Female, aged 42. "Bad cold in the nose for a long time." Right antrum full of foul pus. First molar removed by dentist and pus issued from the socket; in spite of irrigation the discharge continued. Onset of acute suppuration in the right ear. Operation.—Antrum and cells infiltrated with pus. Dura exposed, also lateral sinus. Parts thoroughly cleansed, smeared with B.I.P. and the skin wound sutured. Immediate union. Right maxillary antrum opened by the intranasal method.

This is the old blood-clot method, plus a certain type of antiseptic (B.I.P.). It is a great saving of time and expense when patients can be discharged from the Home in a fortnight.

Tumours of the Eighth Nerve.—Mr J. S. FRASER.

Etiology.—Tumours of the eighth nerve are of developmental origin and are probably a mild form of neurofibromatosis. They may be hereditary. There is little evidence that they are associated with otitis media, but Nager believes that they may result from intra-uterine meningitis and consequent neuro-labyrinthitis.

Pathology.—Though tumours of the cerebello-pontine angle may arise from the petrous bone, the dura mater, the choroid plexus, the pia-arachnoid, or the flocculus, there is a well-marked group which originates in the eighth nerve. Some observers hold that the latter begin in the distal portion of the vestibular nerve, but it is more probable that they originate at the junction of the two (central or non-medullated and peripheral or medullated) parts of the eighth nerve, just within the internal auditory meatus. They gradually destroy the cochlear and vestibular divisions by pressure. The surface is nodular and the colour greyish pink. The tumours vary greatly in size (hazelnut to small apple), show denser and looser parts, and may contain cysts and blood spaces. Opinions as to their histology vary greatly. The staining reactions and general appearance of the growths are not those of a fibrous or mesoblastic connective tissue tumour, but correspond more closely to those of gliomata. They are probably "false neuromata" or gliomata arising from the nerve sheath. Verocay believes that they spring from undifferentiated peripheral neurocytes belonging to the crest of nerve tissue lying between the ectoderm and

Societies' Proceedings

the dorsal surface of the neural tube from which the seventh-tenth nerves arise. The eighth nerve (portio mollis) is loose in structure and therefore prone to include this tissue. As the tumour grows the fifth and seventh nerves are pushed upwards and forwards, while the vagus group is pressed down and backwards.

Changes in Labyrinth.—Here the first stage appears to be fibrinous exudation in the perilymph spaces (choked labyrinth), with more or less atrophy of the cochlear ganglion cells of Corti's organ and stria vascularis, especially in the basal coil. Later on the fibrinous exudate becomes organised into delicate myxomatous tissue. New bone formation may be seen in this. As a rule the vestibular maculae are well preserved in spite of the pressure destruction of the vestibular ganglion, but in advanced cases the cristae of the canals show atrophy.

Symptoms.—As a rule symptoms of acousticus tumour do not appear below the age of twenty—thirty to fifty years is the usual period. The clinical history may be divided into three stages:—(1) Initial or "otological," commencing with tinnitus, deafness, and giddiness, loss of balancing and nystagmus, and ending with headache which is worst at night. Vestibular disorders may precede the cochlear symptoms. In the earliest phase deafness is not complete, and the vestibular reaction may be present, though diminished. (2) Intermediate or "neurological" with headache (occipital and later frontal), tendency to fall to side of lesion, loss of tone in limbs on homolateral side with dysdiadokokinesia, involvement of neighbouring nerves producing loss of conjunctival reflex, diminution of cutaneous and buccal sensibility (5th), diplopia (6th), facial weakness or paralysis (7th). Later on there is dimness or loss of vision (choked disc), paresis of palate, dysphagia, thickness of speech, loss of taste, anosmia, tachycardia. Homolateral paresis of the tongue may be present. The so-called "cerebellar seizures," or vagal attacks, are a distressing feature. They may be preceded by giddiness, headache, dimness of vision or congestion of face. At first the patient is conscious during the attacks, but later unconscious. The pupils are dilated during attacks, with stertorous breathing and rapid irregular pulse. There are jerkings of the head and extremities, followed by general rigidity and opisthotonus. The attacks may be accompanied by vomiting and followed by sweating. Cushing attributes them to excessive tension in the lateral lymph cistern in which the tumour lies. (3) Terminal stage with disturbance of memory, loss of weight, weakness of sphincter control, periods of excitement resembling those of delirium tremens, dementia, Cheyne-Stokes respiration and coma.

Examination of the Ears.—All observers admit that the ideal we have to aim at is the recognition of the lesion at the "otological" stage. For this reason a thorough examination of the cochlear and vestibular

Royal Society of Medicine

function is essential. At first the signs of nerve deafness may not be absolute. Further, vestibular response may be obtained, so that diagnosis at this period appears almost impossible. Concentric narrowing of the range of hearing is characteristic. Weber's test is lateralised to the good ear; Schwabach shortened on the affected mastoid: absolutely negative Rinne on affected side; later on, total deafness on the affected side, as tested with the noise box in the sound ear. Vestibular examination shows spontaneous rotatory nystagmus, which is usually more marked to the affected side. Spontaneous nystagmus on looking up has been frequently observed. The nystagmus may change from time to time, as in cerebellar abscess. There is also loss of vestibular response to the caloric and galvanic tests. The pointing reaction is usually normal. The rotation test is not so satisfactory as the caloric, which on the healthy side gives a normal or even an excessive reaction—"lasting nystagmus"—with the usual pointing error. On the other hand, there is no caloric reaction from the affected ear and no pointing error. The galvanic reaction is reduced or absent on the affected side.

Differential Diagnosis.—If solitary tumours of the eighth nerve are to be diagnosed at the early stage it is of the utmost importance that otologists should thoroughly examine all cases of unilateral nerve deafness. Eighth nerve neuroma must be diagnosed from:—(1) Acquired syphilitic neurolabyrinthitis by the history and the Wassermann reaction of the blood and cerebro-spinal fluid. (2) Neuritis of the cochlear or vestibular (or both) divisions due to (a) exposure to cold wind; (b) toxæmia; (c) quinine, salicylate, arsenical poisoning. One does not find complete deafness and certainly not total loss of the vestibular reaction in the above conditions. (3) Hæmorrhage into the labyrinth, by blood examination. (4) Senile or arterio-sclerotic deafness is bilateral; the vestibular reactions are retained. (5) Unilateral congenital deafness is rare; the vestibular reaction is usually present. (6) Circumscribed labyrinthitis is associated with otitis media. (7) Latent labyrinthitis can be diagnosed by the history and the galvanic test. (8) Otosclerosis by functional examination. (9) Serous meningitis in the lateral cistern (Bárány's symptom complex) is associated with a history of otitis media and a well-marked pointing error. Lumbar puncture results in improvement and a return of normal caloric reaction.

Cushing gives the following list of errors in diagnosis: (a) The symptoms of tumour of the acoustic nerve are ascribed to another lesion—Bell's palsy, trigeminal neuralgia, multiple sclerosis, multiple neuritis of cerebral nerves, torticollis, bulbar paralysis, locomotor ataxia, tuberculous or syphilitic basal meningitis. (b) A tumour is diagnosed but incorrectly localised—*e.g.*, tumours of the corpora quadrigemina, of

Societies' Proceedings

the third ventricle, of the temporal lobe, of the cortical facial area, or of the frontal lobe. Pontine tumours are characterised by paralysis of the eye muscles (Hezel). (c) A tumour is correctly localised in the cerebello-pontine angle, but the relation of the growth to the eighth nerve is not appreciated. There may be difficulty in diagnosing the side of the tumour. The best method is to judge by the deafness and the results of vestibular examination. Oppenheim states that ocular paresis, unilateral loss of the corneal reflex and of the function of one eighth nerve make up the characteristic triad of symptoms of tumour of the acoustic nerve. Henschen points out that the portion of the tumour in the internal meatus dilates the meatus, and that this can be seen in a good radiogram.

Prognosis.—Toynbee and Henschen have recorded cases with deafness 16 to 20 years before death. Henschen gives the average duration of illness as three and a half years. Cases in young subjects are more rapid in their progress. Only solitary unilateral tumours are suitable for operation. Bilateral cases are associated with general neurofibromatosis.

Treatment.—There are two routes by which the tumour may be reached: (1) Occipital—either (a) unilateral (Krause), or (b) bilateral (Cushing): (2) translabyrinthine (Panse and Quix). (These two routes may be combined.) The mortality by the Krause method was 80 per cent. Cushing's mortality was only 20 per cent. In 1904, Panse proposed that tumours of the acoustic nerve should be removed through the middle and inner ear, and in 1911, Quix of Utrecht was the first to operate by this route. The only objection is the risk to the facial nerve, but this has already been destroyed by the tumour in many cases. It is necessary to perform a free radical mastoid operation, and thereafter to obtain space reaching in front to the carotid canal, below to the jugular bulb, behind to the sigmoid sinus, and above to the dura of the temporo-sphenoidal lobe. The danger of injuring the carotid is small. The inferior petrosal sinus and jugular bulb are much more likely to be injured and to give rise to troublesome hæmorrhage. After removal of the petrous pyramid, one raises the temporo-sphenoidal lobe and splits the dura beneath the superior petrosal sinus as well as that lining the internal meatus, and thus completely exposes and removes the tumour. The wound cavity is packed with iodoform gauze and a plastic operation performed on the membranous meatus. Four cases have been operated on by the translabyrinthine route, and as yet there have been no deaths (Schmiegelow). If a tumour cannot be removed by the translabyrinthine it cannot be removed entire by the paracerebellar route.

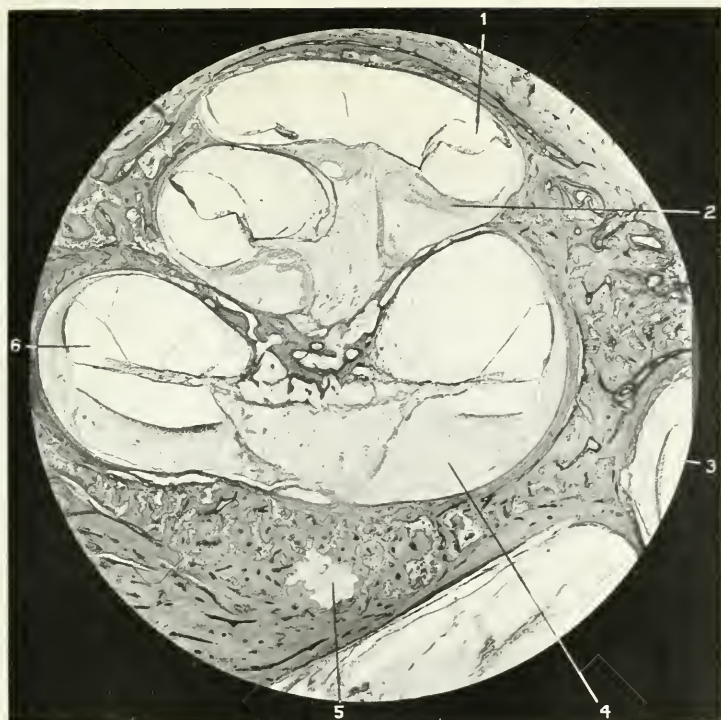


FIG. 1.

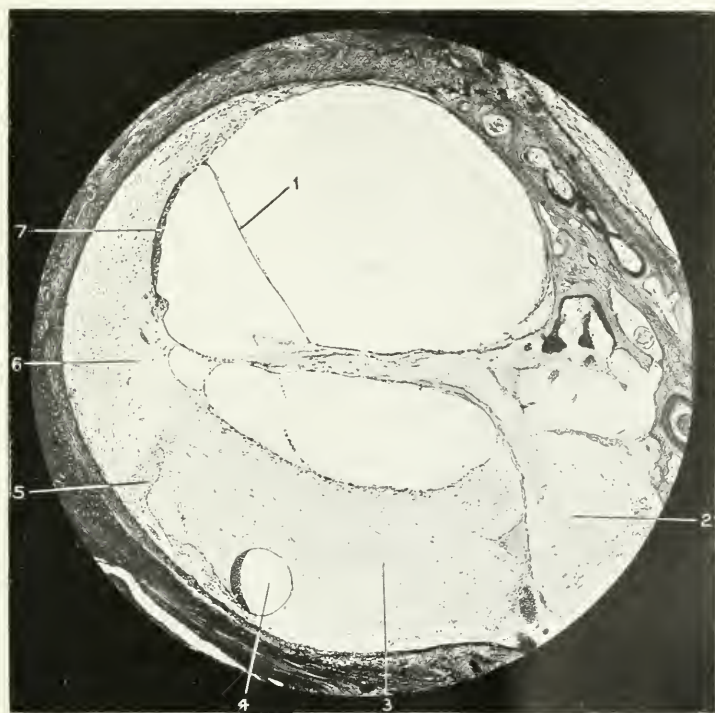


FIG. 2.

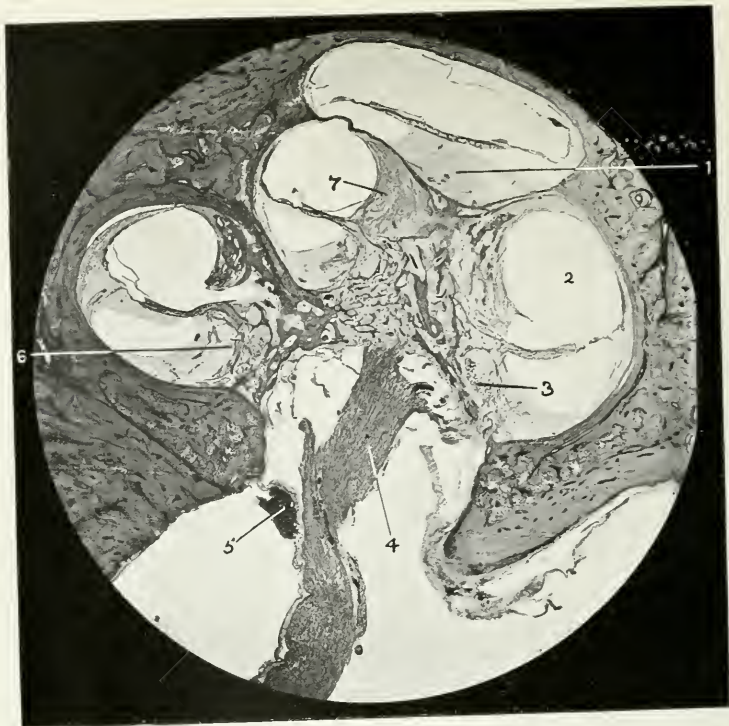


FIG. 3.

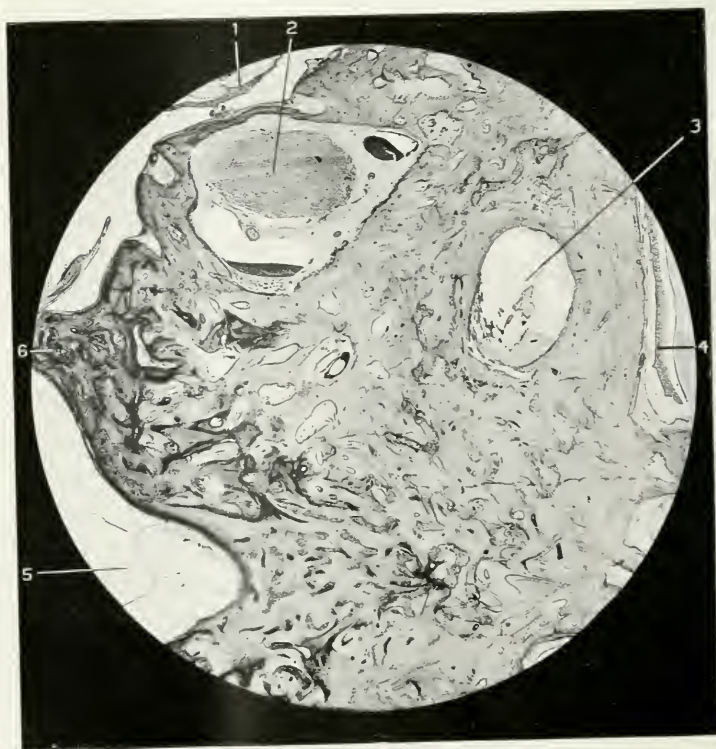


FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.

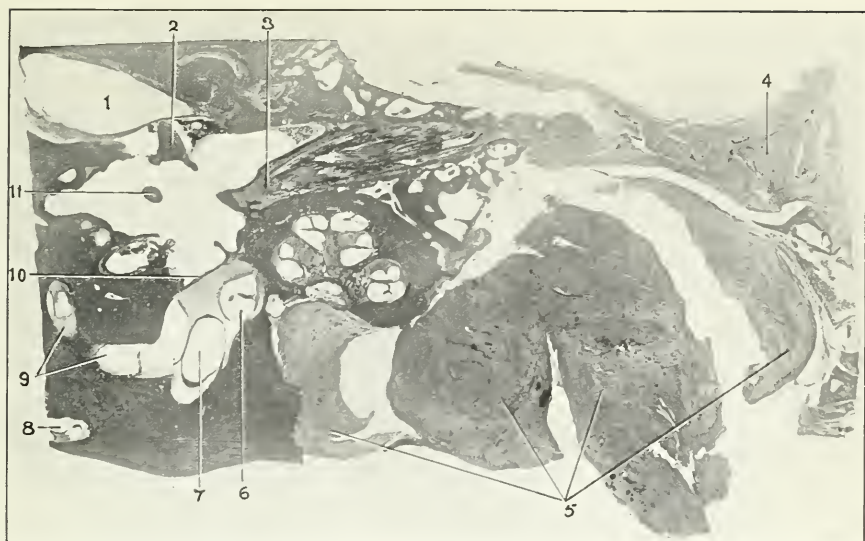


FIG. 9.

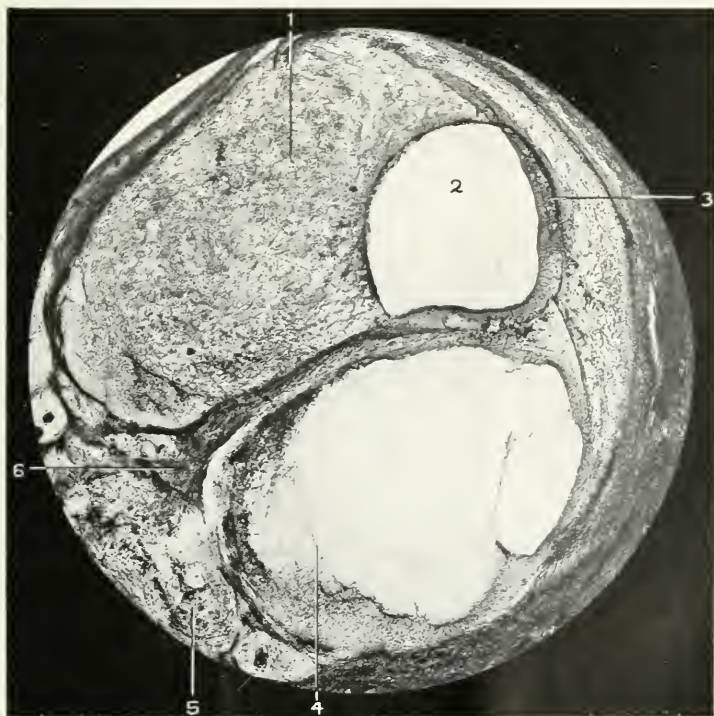


FIG. 10.

Royal Society of Medicine

DESCRIPTION OF PLATES.

- FIG. 1 (Case I.).—M. McQ., female, aged 75. Tumour of right nervus acusticus. Horizontal section of right ear, No. 170, $\times 17$ diam. Axial section through cochlea and internal meatus. 1, Scala media of upper part of middle coil, showing Corti's organ; 2, new bone formation in scala tympani; 3, saccule; 4, new connective or tumour tissue in scala tympani of basal coil; 5, erosion of cartilage capsule of cochlea by tumour tissue; 6, cochlear canal of lower part of basal coil, showing absence of Corti's organ and degeneration of spiral ligament.
- FIG. 2 (Case I.).—Horizontal section through basal coil of cochlea (right ear), No. 205, $\times 48$ diam. 1, Reissner's membrane; 2, spiral canal with marked atrophy of ganglion cells; infiltration by delicate connective tissue; 3, delicate connective or tumour tissue in scala tympani; 4, large vein; 5, new-formed bone; 6, myxomatous or dropsical degeneration of spiral ligament; 7, stria vascularis: note absence of Corti's organ.
- FIG. 3 (Case I.).—Horizontal section of left ear (*i.e.* side opposite to the tumour), No. 80, $\times 17$ diam. 1, New connective tissue in scala tympani of apical coil; 2, greatly dilated cochlear canal of upper part of middle coil; note new connective tissue and bone in scala vestibuli; 3, spiral ganglion cells still present; 4, cochlear nerve; 5, hemorrhage between dura mater and bone; 6, scala tympani of lower part of basal coil with new connective tissue and bone formation; 7, scala vestibuli of middle coil filled with new bone formation.
- FIG. 4 (Case I.).—Horizontal section through left ear, No. 185, $\times 17$ diam. 1, Thickened fold of tympanic mucosa; 2, facial nerve; 3, convexity of lateral canal, showing new connective tissue and bone formation; 4, thickened mucosa of antrum with exudate; 5, utricle; 6, posterior margin of oval window.
- FIG. 5 (Case II.).—A. T., female, aged 25. Tumour of right eighth nerve. Horizontal section of right ear, No. 90, $\times 6$ diam. 1, Head of stapes with stapedius; 2, facial nerve; 3, posterior canal with hemorrhage in perilymph space; 4, tumour; 5, lower part of utricle; 6, dilated internal meatus with tumour.
- FIG. 6 (Case II.).—Horizontal section of right ear, No. 120, $\times 20$ diam. 1, Thickened membrane of round window; 2, new bone formation in connective or tumour tissue in scala tympani; 3, spiral canal infiltrated, and ganglion cells absent; 4, remains of cochlear nerve in fundus of internal meatus; 5, canal for nerve to crista of posterior canal infiltrated as above; 6, endolymph space of posterior canal.
- FIG. 7 (Case II.).—Shows middle fossa of skull after removal of dura, with deep pits in the bone.
- FIG. 8 (Case II.).—Shows tumour of the pia-arachnoid, which occupied one of the small bony erosions: the section shows a fibrous, cellular growth, apparently composed of neuroglial tissue. The neuroglial fibres appear to run in bundles in various directions. Cushing holds that these swellings are hypertrophied Pacchionian bodies, while Key believes that they are gliomatous metastases in the arachnoid. They certainly appear to be of a gliomatous nature.
- FIG. 9 (Case III.).—W. H., male, aged 43. Tumour of right eighth nerve. Horizontal section of right ear, No. 147, $\times 4$ diam. 1, External meatus; 2, malleus; 3, tensor tympani; 4, Gasserian ganglion; 5, tumour; 6, dilated saccule with granular contents; 7, utricle; 8, smooth end of posterior canal; 9, lateral canal; 10, footplate of stapes; 11, long process of incus.
- FIG. 10 (Case III.).—Axial section through right cochlea, No. 147, $\times 50$ diam. 1, Fibrinous and granular exudate in scala vestibuli; 2, dilated cochlear canal; 3, stria vascularis; 4, fibrin threads in scala tympani; 5, spiral canal; some ganglion cells are still to be seen; 6, nerve entering bony spiral lamina.

Societies' Proceedings

Atresia of External Meatus.—H. BEDFORD RUSSELL.—Male, aged 24. Left ear has never discharged. Hearing—C.V. at 6 ft. The atresia was probably the result of a pathological change.

Vertigo.—W. M. MOLLISON.—Male, aged 32, has had from two to five attacks of vertigo per week since 1918. Objects appear to move; vomiting; deafness in left ear; tinnitus. Wassermann negative. Caloric test produced slight reaction with past pointing. Lumbar puncture; fluid clear but under increased pressure. No abnormality of nervous system found. The patient was free from attacks for six weeks after lumbar puncture.

Destruction of the Tympanic Membrane by Hot Fluid.—LIONEL COLLEDGE.—The patient upset a cup of hot tea over her right ear four months ago. Great discharge from, and swelling of, the meatus. Perforation of almost the whole of the membrana tensa. Tinnitus in right ear since the accident.

November 19, 1920.

President—Sir CHARLES BALLANCE, K.C.M.G.

The President in his introductory remarks referred to the progress of otology in this country. He looked forward to the foundation of a great Central Institute of Otology in London for the purpose of co-ordinating and strengthening the work of teaching and research. He hoped that, in the future, individual clinics might be run on the unit system with Government grants for whole time men: thus teaching and research would be endowed and strengthened. We were only on the threshold of knowledge of diseases of the ear. The Council of the Section have decided to memorialise the two Royal Colleges to grant a diploma in Otology.

Chronic Catarrhal Otitis Media — Sir WILLIAM MILLIGAN.—There has been no really substantial progress in the treatment of this disease during the past twenty years. The essential pathological changes may be classified as follows:—(1) Surface epithelial changes; (2) connective tissue changes, hypertrophic and sclerotic; (3) atrophic changes. All of these may occur separately or collectively. The principal cause is repeated attacks of exudative catarrh of the tubotympanic mucosa. The neglected catarrh of early life is *facile princeps* the main cause of chronic adhesive changes in after life.

The treatment of exudative catarrh in young children is too often inefficient. We forget, or have not the opportunity of following up, the case. The immediate benefit resulting from removal of adenoids and the return of practically normal hearing within a few days either

Royal Society of Medicine

with or without Politzerisation are results so remarkable that the tendency is to consider all is well; but is it so always? How many cases return in a few years with evidence of adhesive changes, and why? I believe the main reason is because we do not completely drain the middle ears of all secretion at the proper time. I maintain that the indication to incise the membrana tympani and drain the middle ear is almost as necessary in exudative catarrh as in suppurative catarrh. Viscid exudate in the hypo-tympanum, or organised connective tissue around the tympanic orifice of the tube, is the cause of the ultimate leucocytic activity in the subepithelial layers of the muco-periosteum. Dense sclerotic white fibrous tissue is formed either locally or diffusely in the middle ear, a tissue which gradually contracts and leads to rigidity or ankylosis of the ossicular chain, or to occlusion of the fossula rotunda with still further impairment of hearing. In the long run atrophic changes ensue with a gradual opening up of the Eustachian tube, but the damage is done and the middle ear has practically ceased to function. If we desire to combat progressive changes and to obtain benefit from intratympanic injections it should be in the nature of a lavage—in other words we should provide a vent, we should incise the membrana tympani and wash out the middle ear with the aid of the catheter and air douche. Patients frequently say that after a course of intratympanic injections their hearing capacity has been made worse. We are dealing with what may be shown one day to be a microbic disease affecting the deeper layers of the muco-periosteum—a condition of a diffuse fibrosis somewhat akin to “keloid.” There is a prevalent conception that ankylosis of the ossicular chain—more especially synostosis of the stapedio-vestibular articulation—is a common sign of adhesive middle-ear catarrh. Clinical and pathological experience and observations made during operative interference compel me to think that it is not so common as is generally supposed. I believe that the tendency is to over-estimate the importance of the stapedio-vestibular articulation and under-estimate the importance of changes in the “membrana secundaria.” How often in past years, when operations for the relief of chronic catarrhal deafness were the fashion, we have found the stapes freely mobile when we expected to find it ankylosed? As the fibrosis starts from the region of the Eustachian orifice, it reaches the region of the fossula rotunda at a relatively earlier period of time than the region of the fenestra ovalis. Hence the many cases in which although there is well-marked middle-ear deafness there is no paracusis.

The potential vacuum in the middle ear, resulting from tubal obstruction, still further accentuates the difficulties. Can we do anything to maintain an equable pressure upon the two sides of the membrana tympani during the time we direct our energies to relieve

Societies' Proceedings

the existing tubal obstruction and arrest the advancing sclerosis? I consider that we underestimate the advantages to be attained from artificial perforation of the membrana tympani with a fine galvano-cautery point. It is, however, no use doing so if the patient has already lost more than 75 per cent. of normal hearing, as by this time sclerotic changes are so advanced as to preclude any hope of benefit following. An open perforation maintains an equal pressure upon both sides of the membrana tympani, relieves tension, arrests exudation, and affords a direct channel through which medicaments may reach the inner wall of the middle ear. To maintain an open perforation we should imitate what nature does in old suppurative cases—we should endeavour to epithelialise its edges by the implantation of epithelial cells, an extremely delicate and difficult piece of work, but possible of execution with care and patience.

Future progress in the treatment of chronic adhesive catarrh appears to lie in the employment of radio-active substances whose rays have the power of softening and rendering pliable dense sclerotic tissue. The β and γ rays of radium, or its emanation, if properly filtered, have the power, probably in virtue of their action upon connective tissue cells, of transforming hard and dense mesoblastic tissue into something approaching embryonic tissue—soft and pliable. Everything depends upon dosage, duration of exposure, and effective filtration, and it is to these problems I am devoting my thoughts.

Streptococcal Leptomeningitis in a Child due to Chronic Suppurative Otitis Media; Rapid Development of Coma; Radical Mastoid Operation with Translabrynthine and Lumbar Thecal Drainage, with Complete Recovery—Mr SYDNEY SCOTT.—Girl, aged 10, admitted 23rd July 1920, in a state of unconsciousness, with purulent discharge from the left ear: temperature 104° F., pulse 130, respirations 30; head retracted; extensor-rigidity of the hamstrings; reflex cry on attempting to flex the head; marked rotatory nystagmus to right. Mr Scott considered that otitis media had led to involvement of the labyrinth and that this would account for a meningeal effusion. *Operation*—Antrum and cells contained pus, granulations, and cholesteatoma. A carious patch of bone led back to a parasinus extradural abscess containing nearly a drachm of pus. The external semicircular canal was not eroded, and though no channel of infection to the labyrinth was identified, an opening into the vestibule was made below the facial nerve; the cochlea was extirpated in order to open up the fundus of the internal auditory meatus, and establish translabyrinthine drainage. Lumbar puncture yielded about 10 c.c. of turbid cerebro-spinal fluid containing streptococci. Lumbar puncture was repeated at intervals of twelve hours during the next few days. On the fourth day it was reported

Ear

to be "straw-coloured, clear and sterile." On the third day the flow of cerebro-spinal fluid from the labyrinth ceased. There was temporary facial paralysis. Recovery uninterrupted.

Two Cases of Gunshot Wound of the Temporal Bone—
THE PRESIDENT and Sir JAMES DUNDAS-GRANT.—In both there was extensive caries of bone. The radical mastoid operation, followed by grafting, gave excellent results.

ABSTRACTS

EAR

Invasion of the Internal Ear by Tympanic Suppuration. I. FRIESNER.
(New York, *American Journal of Surgery*, May 1920.)

The infection is much more frequently chronic than acute. The most frequent of the acute infections is that associated with scarlatina. In this, by reason of the virulence of the organism, there is a rapid sloughing of the tissues of the middle ear, and often a caries of the outer labyrinthine wall, and invasion, and more or less complete destruction, of the labyrinth. Even in such fulminating processes, however, the pathway of the labyrinthine invasion strongly influences not only the extent of the destruction within the labyrinth but the type of intracranial complication should this occur. When infection occurs through the solid walls of the labyrinth, the invasion is less rapid and less frequently fatal than when by the windows. It is for this reason that, while clinical observations show more fistulæ in the semi-circular canal, post-mortem findings show fistulæ in the windows as the most common pathway. Inflammation of the bony wall of the labyrinth, with fistula formation, usually at the point of maximum exposure of the external semicircular canal, generally follows chronic middle ear suppuration, either with cholesteatoma or tuberculosis. A fistula may, however, occur with an acute or subacute mastoiditis. Even before the formation of an actual fistula there is an internal reaction, a thickening of the endosteum and trabeculæ supporting the membrane, and it is this protective reaction against invasion which probably accounts for the labyrinthine symptoms which precede the formation of a definite fistula. It has long been noticed that the "fistula reaction" varies considerably in the type and direction of the resulting nystagmus, especially in tuberculous cases. The post-mortem examination of one such case which gave a reaction against the rule, showed the fistula in the external semicircular canal to be both tortuous and

Abstracts

oblique—a common feature of tuberculous bone fistulæ in general. The obliquity of the fistula, *i.e.*, towards or away from the ampulla, aided possibly by occlusion of the membranous canal on one side or the other of the fistula, must play an important part in determining the type of the nystagmus in the so-called “fistula reaction.”

The labyrinthine wall once penetrated, resistance may for a time circumscribe the infection, but sooner or later a diffuse labyrinthitis results.

GILBERT CHUBB.

Comparative Anatomy of the Mastoid Process. LÉONHARD.

(*Revue de Laryngologie*, January 1921.)

The writer points out that the growth of the mastoid process in infants and young children proceeds *pari passu* with the assumption by them of the erect position. In the erect position the balancing of the head on the vertebral column is chiefly effected by the traction of the sterno-mastoid muscle. The greater development of the mastoid in human as compared with animal skulls is due to the erect position of the head.

G. WILKINSON.

The Caloric Test in the New-born. A. THORNVALL. (*Acta Oto-laryngologica*, Vol. ii., fasc. 4.)

Bárány and others have found that the vestibular movements of the head during and after rotation can be observed much more distinctly in the new-born than in adults. As regards the caloric test, on the other hand, the position appears to be less clear. Hald in Denmark and Ruttin in Vienna came to the conclusion that it is not often possible to elicit nystagmus after caloric stimulation in the new-born.

The writer examined 74 infants of ages from 4 hours to 8 days, and obtained the reaction rapidly and definitely in all cases, but with certain differences from what is observed in adults.

Very young infants resemble persons under the influence of an anæsthetic in that the power of voluntary fixation is absent. Hence, in both, the eyes show a tendency to hesitate in the slow phase of the nystagmus, and this has probably given rise to the idea that the reaction cannot be provoked in some infants. As a rule there is a true and definite nystagmus, but usually with the hesitation mentioned. The direction of the nystagmus, moreover, is altered, exactly as would be expected, by a change in the position of the infant. Reflex movements of the head, but not of the extremities, are observed in many infants after the caloric as after the rotation test.

THOMAS GUTHRIE.

The Histology of Traumatic Deaf-Mutism. ALEXANDER.

(*Monats. f. Ohrenh.*, Year 55, Vol. i.)

Commencing with a quotation of certain cases dating back to 1842, in which this aspect has been studied, and continuing with a historical

Ear

survey of the literature on this subject, the author gives a minute account of one of his own cases.

The patient, a man aged 37, was severely injured in an accident on 29th of January 1912, from which he died in two days. A detailed account is given of the histological condition of both ears.

The only reference to his previous deaf-mutism is a note to the effect that he was known to have been a deaf-mute, as the result of an injury, since childhood. The article is illustrated by clear diagrams of the normal inner ear and of the pathological conditions discovered. The author's findings, which of course embrace varying forms of osteitis, epithelial and nerve degenerations, correspond generally with what is already known.

ALEX. R. TWEEDIE.

Vertigo. SYDNEY SCOTT. (*Lancet*, 1920, Vol. x., p. 535.)

Mr Scott deals here with vertigo, especially in respect of its surgical and medical treatment. He discusses its frequency, and points out how it may be so completely overshadowed by more obvious disturbances (vomiting, titubation, faintness) as to throw physicians off the scent. On the other hand, vertigo may mask other complaints; it may be cardiac, gastric, renal, or referable to local hæmorrhage or infection. The writer points out the occasional vertigo due to unilateral Eustachian inefficiency. Indications are given as to treatment.

MACLEOD YEARSLEY.

Facial Paralysis as an Indication for Mastoid Operation in Acute Middle-ear Suppuration. B. DYBWAD DANIELIUS. (*Acta Otolaryngologica*, Vol. ii., fasc. 3.)

In cases of labyrinth destruction sequestra may exert direct pressure on the nerve, but paralysis in acute otitis media must clearly very seldom be due to gross lesions of this sort. The paralysis is usually attributable to hyperæmia in the region of the stylo-mastoid artery, collateral œdema, or toxic influences. A similar condition occurs in the case of the optic nerve in association with certain diseases of the accessory sinuses.

Mygind regards the paralysis as an absolute indication for operation, but not as an infallible sign of osteitis. Denker holds the same view, while Heine and Alexander consider that the question of operation is only to be decided by a consideration of the case as a whole.

Among 700 cases of mastoid operation in acute otitis, paralysis was present in 7. In all of these it was of the peripheral variety, and in all the mastoid region was normal, so that the paralysis or paresis was the only symptom indicating operation. The short histories of these cases show that in two of them osteitis was absent,

Abstracts

in two present to a slight degree, and in three was marked. Since therefore it is not possible to exclude in such cases the presence of serious bone disease the paralysis should be regarded as a definite indication for operation; and this view is supported by the fact that in five of the seven patients the paralysis began to clear up immediately after the operation, so that a causal connection between the operation and the improvement was obvious.

THOMAS GUTHRIE.

The Chances of Cure of Mastoiditis by Tentative Tonsillo-Adenectomy.

OTTO GLOGAU. (*The Laryngoscope*, 1920, Vol. xxx., p. 83.)

The author holds that hypertrophied and diseased adenoids and tonsils form a constant source of infection and reinfection for the middle ear. Removal should be urged during the acute suppurative stage of otitis media, and should by all means be performed if the discharge lasts longer than three weeks. Paracentesis should also be done. The classical mastoid symptoms (pain, fever, sagging, redness or swelling over the mastoid) are nature's last danger signals for the removal of the offending adenoids and tonsils. By the restoration of tubal drainage and aeration, together with the depletion of the nasopharynx, the restorative forces of nature are helped to overcome the infection of both the mastoid and the middle ear. Pain, fever, and tenderness gradually decrease. Even sagging of the canal wall and œdema over the mastoid region will disappear within a short time. According to Glogau the removal of tonsils and adenoids is a curative factor even in the acute mastoid exacerbation of chronic conditions.

Cases of involvement of the labyrinth or the sinus, those complicating infectious diseases, and those with necrosis of the bone as demonstrated by the Roentgen picture, are excluded from tentative tonsillo-adenectomy. In all other cases of mastoiditis in children up to the age of eight the "offensive lymph tissue" should be extirpated, even at the critical stage of the disease. (Ten cases are recorded.) It is not claimed that every case of even mild mastoiditis will be cured by tentative tonsillo-adenectomy. The suggestion is only made that we should give the patient a chance of having a major operation replaced by a minor one.

J. S. FRASER.

Cure of Chronic Purulent Otitis Media. J. G. CALLISON. (*The Laryngoscope*, Vol. xxx., 1920, No. 11, p. 757.)

The writer advises a saturated solution of nitrate of silver.

Method.—Patients are seen at intervals of from four to seven days. The ear is carefully cleaned and dried with cotton applicators. As much pus as possible is now removed by suction and the ear again carefully dried. Then, under direct vision, the saturated solution of

Ear

nitrate of silver is carefully applied to the fundus, allowing it to penetrate as far as possible beneath the edges of the drum remnants, and into the Eustachian tube. In *exceptional cases* this procedure causes pain, and it is well to begin with a 25 per cent. solution and increase to 50 per cent., and then to a saturated solution. If a free discharge of pus is present, the patient is instructed to irrigate the ear once or twice a day with boric lotion. After irrigation the ear is dried, and about five drops of the above solution placed in the ear. The treatment is continued until long after the ear seems to be dry. The time required to effect a cure has varied from a few weeks to several months.

J. S. FRASER.

Observations on Three Cases of Deafness from Hereditary Syphilis.

C. HENNEBERT. (*Arch. Ital. di Otol.*, Vol. xxxi., No. 3, 1920.)

Deafness from hereditary syphilis may come on as late as 22 or 28 years, according to previous investigations by Hennebert. In the first of the cases referred to here the deafness had come on in infancy, in the second at the age of 15, and in the third at 8 years. In the third case the deafness progressed rapidly and was complete in two months. In the first two patients there was some hearing power left. Rotation tests on the first case gave nystagmus to one side for twenty seconds, and none to the other side. In the second case there were only a few jerks to either side. In the third case the rotation tests gave normal responses. The caloric reactions were negative in the first two cases and positive in the third case. The pneumatic or fistula test was positive in the first two cases. In Hennebert's experience the pneumatic test is generally positive, the rotation test negative, and the caloric test diminished.

J. K. MILNE DICKIE.

Popular Fallacies in the Practice of Otology. GEORGE E. SHAMBAUGH.

(*The Laryngoscope*, Vol. xxx., 1920, No. 11, p. 683.)

The most striking fallacy is the assumption that any existing alteration in the nasal passages, especially the common anatomical irregularity of the nasal septum and the compensatory enlargement of the lower and middle turbinated bodies, are causes of middle ear disease. Another common fallacy is to assume that in all cases of obstructive middle-ear deafness long-continued inflation of the middle ear is indicated. In primary fixation of the stapes and in most cases of chronic adhesive middle-ear catarrh, inflation does no good. A third fallacy is that all cases of chronic discharge from the ear, which cannot be checked by local treatment in a reasonable period, are cases where radical surgical measures are called for. Most cases of chronic discharging ears are not a serious menace to the patient in the sense that they may lead to

Abstracts

an intracranial complication. We have, as a rule, little difficulty in differentiating the dangerous from the non-dangerous cases. The presence, after the radical mastoid, of moisture which comes from the patulous Eustachian tube is not an indication that the operation has been a failure.

J. S. FRASER.

NASO-PHARYNX AND PHARYNX.

Complete Alopecia Areata of the Scalp treated by Removal of Tonsils and Adenoids, and by Vaccines. H. W. BARBER. (*Proc. R.S.M., Sect. of Dermatology*, March 1921, p. 53.)

Boy aged 12. Complete alopecia of five years' duration. Chronic rhinitis. Tonsils very hypertrophied, and large mass of adenoids with constant muco-purulent discharge. Tonsils were enucleated and adenoids removed, and cultures made from the tonsils. The growth was chiefly of *Streptococcus pyogenes longus*, from which vaccines were made and administered for about five months. Within two months of operation, hair was growing freely and patient has now almost a complete re-growth of normal hair.

G. B. BRAND.

Foreign Body (Chewing-gum) in the Naso-Pharynx. ORENDORFF.
(*Journ. Amer. Med. Assoc.*, 13th November 1920.)

A patient, aged 13 years, presented typical symptoms of adenoids. Inspection of the throat revealed a slight convexity of the soft palate which was assumed to be due to a large mass of adenoids. No examination with a post-nasal mirror or by palpation was made. At operation the curette brought away a mass of ordinary chewing-gum and a little adenoid tissue. The child was found to be an inveterate user of chewing-gum, which he kept in his mouth while in bed.

PERRY GOLDSMITH.

The Removal of Adenoids in Infancy. HUNTER TOD.
(*Practitioner*, November 1920.)

Nasal obstruction is a serious matter in infancy, owing to the interference with breathing, and also with nutrition. The younger the child, the more serious are the consequences. Objections to the removal of adenoids at an early age are seldom justified, although there may be a return of the growths in a small proportion of cases. Under the age of six months no anæsthetic is required. The infant is held in a sitting position, while the adenoids are removed by a single sweep of a small curette. After operation the infant breathes quietly and sucks with comfort, and otorrhœa and bronchitis disappear.

DOUGLAS GUTHRIE.

Larynx

Multiple Bone Formation in the Tonsils. CALHOUN.

(*The Laryngoscope*, 1920, Vol. xxx., p. 428.)

Cartilaginous or bony deposits in the tonsil are supposedly due to vestigial remnants of the second branchial cleft, or to a metaplasia occurring in fibrous tissue. *Case*—Man of 40 years, had several attacks of sore throat. The tonsils were removed under local anæsthesia, but there was the sensation of cutting through very tough tissue. Both tonsils contained in their substance numerous hard bodies, smooth and white, of varying sizes. Microscopic examination showed them to be bone. J. S. FRASER.

LARYNX.

Ultero-Membranous Laryngitis of Streptococcic Origin. J. A. M.

HEMMEON. (*Brit. Med. Journ.*, 17th May 1919.)

During October and November 1918 a series of cases of laryngitis was admitted to No. 3 Canadian General Hospital, Boulogne, both from the front and base areas, presenting unique features both in their laryngeal pictures and in the almost complete absence of general symptoms. No attempt is made to trace their connection with any of the influenzal or other streptococcic infections then prevalent. Similar conditions of the larynx were not seen in patients suffering from influenza in hospital at that time. Fifty cases were observed.

Onset.—Usually malaise, headache and pain in limbs. Temperature in ten cases rose to 102°; in fifteen varied from 99° to 101°; and in twenty-five remained normal.

Laryngeal Symptoms.—Cough, hoarseness (10) or aphonia (40) developed in from one to five days. Recovery was complete in from eight to twenty-five days (average seventeen days).

Objective Signs.—The vocal cords showed ultero-membranous changes, usually the middle third of the cords was involved, and in this respect the picture resembled that of traumatic laryngitis from gas. The greyish translucent membrane lay symmetrically on both cords, and might involve as much as two-thirds of their upper surface and free edge. The membrane could be removed with difficulty by grasping with forceps or rubbing with a cotton swab. A raw bleeding surface was left which was quickly covered again by membrane. After the third or fourth day the edges of the membrane were seen to be curling up, or might have been removed, and a shallow ulcerated surface was exposed. The free edges of the cord were invariably involved, and very early

Review of Book

showed thickening, and later a "mouse-nibbled" appearance. The arytenoids and ventricular bands were unaffected.

Treatment consisted in resting the voice completely, stopping smoking, and inhaling medicated steam.

After the disappearance of the membrane the cords were red, injected and somewhat thickened or roughened at the edges.

Bacteriology.—Cultures were taken from the cords under indirect and direct laryngoscopy. Of 50 cultures, 35 showed streptococci in almost pure growth; 10 showed the same as the prevailing organism; and the remainder were indefinite. Of the 35 streptococcic growths, 25 were classified as streptococcus hæmolyticus and 10 were streptococcus viridans.

A. BROWN KELLY.

REVIEW OF BOOK

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. ROSS HALL SKILLERN, M.D., Professor of Laryngology, Medico-Chirurgical College, Post-Graduate School, University of Pennsylvania, etc. 300 Illustrations. Third Edition, thoroughly revised and enlarged. 1920: J. B. Lippincott Company, Philadelphia and London. Price 30s. net.

The fact that this is the third edition of this book in seven years may be taken as a fair criterion of its popularity. It has been difficult to add anything new in this limited field of a limited specialty during the last rather strenuous years, but Dr Skillern has endeavoured to collect what fresh material there was and present it to his readers in an interesting and lucid manner. The first hundred pages are devoted to the anatomy of the outer wall of the nose and general considerations of sinus disease. The formation of the outer wall is minutely described and the illustrations are clear and illuminate the text. It is a little doubtful, perhaps, if the author makes any clearer the positions of those bugbears of the student—the hiatus semilunaris, the infundibulum, and the fronto-nasal duct. The views of various investigators on the physiology of the sinuses and their rôle in respiration are well presented and discussed. Tables are given showing the relative occurrence of the different bacteria in sinus suppuration and the pathology of the complications encountered in rhinological practice.

The first section deals with the maxillary antrum. Normal anatomy and various abnormalities are described and illustrated. The view is expressed that naso-antral polypus is usually cured by

Letter to Editors

avulsion *per vias naturales*. In the preface to the first edition, reference is made to a certain amount of intentional repetition. This characteristic has been continued in this edition and is occasionally a little wearisome. A good deal of space is taken up by general considerations in maxillary antral diseases which have already been sufficiently reviewed in the section reserved for them. There is a certain *naïveté* for British readers in the following: "It is obvious that they who have plenty of time and means at their disposal will prove much more favourable subjects for conservative treatment than those whose time and money are limited."

The section on the frontal sinus is very good. Accurate and very helpful descriptions of the radical operations are given, and timely hints and warnings regarding the pitfalls and accidents. Ballenger's method of exenterating the ethmoid gets a definite mead of praise, and has become a routine practice of Dr Skillern's. The symptoms and signs of sphenoidal sinus inflammation in all their variety are clearly described and elaborated.

Vaccine therapy in sinus disease is discussed shortly, and the reader is warned not to expect too much from it. In a work of this description one would have expected more space to be given to X-ray investigation.

There are nearly 600 references to the literature of the specialty and these are very accurately given so that the student has no difficulty in following up any particular reference.

Dr Skillern's book may be thoroughly recommended to the medical man who has leanings towards rhinology, and who intends eventually to confine himself to the practice of the specialty.

W. T. GARDINER.

LETTER TO EDITORS.

TO THE EDITORS,

Journal of Laryngology.

DEAR SIRS,—I should like to draw the attention of the profession to a new snare wire which I have been using for some months. The material of which it is made is *Monel Metal*, an alloy containing 67 per cent. nickel, 28 per cent. copper, and 5 per cent. other elements. Monel metal is bright and looks like nickel. It does not corrode, and is very flexible. Its tensile strength is considerably greater than annealed steel wire and apparently about the same as tempered steel wire (94,562 lbs. per square inch). The special advantages which I have found in its use in snares are:—(1) It is very much more

General Notes

easily manipulated than the ordinary piano wire. It stretches slightly more than steel, but not enough to make any practical difference. Everyone who is in the habit of using tempered steel wire has been made painfully aware of its tendency to spring back and puncture the fingers when the ends are being twisted. Incidentally it is difficult to twist unless annealed by heating in a small flame. Annealed wire, while easily twisted, has the drawback of not having enough tensile strength. Monel metal is pliable and at the same time tough enough for the purpose. (2) The snares can be boiled repeatedly without drying or re-threading as the metal does not corrode. (3) This wire can be used over and over again, while steel wire cannot as a rule be used more than three or four times without cracking.

I have used this wire a great deal for nasal work and also for tonsil snares, but here one must be careful that the ends are securely twisted, as the metal is so pliable that the wire may otherwise pull out.

Monel metal is produced by the International Nickel Company. The agents in Great Britain are G. & J. Weir, Ltd., of Glasgow.

Trusting this may be of interest to some of your readers.—I am,
Sir, yours truly,

J. K. MILNE DICKIE.

196 ELGIN STREET, OTTAWA,
29th April 1921.

GENERAL NOTES

BRITISH MEDICAL ASSOCIATION, NEWCASTLE-UPON-TYNE,

19th July—23rd July.

Section of Oto-Rhino-Laryngology.—*President*—G. William Hill, M.D. *Vice-Presidents*—R. Gordon Bell, M.D.; James Don, M.D.; Dan M'Kenzie, M.D. *Hon. Secretaries*—Lionel Colledge, M.B. (22 Queen Anne Street, London, W. 1); W. Frank Wilson, M.B. (97 Jesmond Road, Newcastle-upon-Tyne).

The following provisional programme has been arranged :—

20th July (*Wednesday*), 10 A.M. Discussion: Problems in connection with the Early Diagnosis and Treatment of Meningitis occurring in Aural Cases. To be opened by Sir Charles Ballance, K.C.M.G., C.B.

21st July (*Thursday*), 10 A.M. Discussion: The Various Problems presented by Hæmorrhage occurring in connection with Operations on the Tonsils.

General Notes

The following papers have been intimated:—

1. Statistical records of serious and fatal hæmorrhage resulting from operations on the tonsils.—Dr A. Brown Kelly.
2. General and local conditions, anatomical and pathological, predisposing to hæmorrhage. Contra-indications to operation and prophylactic measures.—Mr J. F. O'Malley.
3. The influence of operative technic in preventing or favouring serious hæmorrhage.—Mr G. Seccombe Hett.
4. Local methods of arresting hæmorrhage from the tonsillar bed, especially in cases operated on in outpatient departments under short anæsthesia. How can the risk of subsequent hæmorrhage be minimised in such cases?—Dr Irwin Moore and Dr C. F. Beevor.
5. Is it ever necessary to resort to ligature of the external or common carotid vessels in the neck? Is such ligation to be relied on? and
6. The treatment of collapse following serious loss of blood from the tonsillar bed.—Mr Douglas Harmer and Mr T. H. Just.

* * *

ROYAL SOCIETY OF MEDICINE.

Section of Otology.—It has been found necessary to cancel the provisional arrangements which had been made in connection with the Meeting of the Section in July, as the Members of the American Otological Society are unable to cross the Atlantic during the summer.

The hope is expressed that our American confrères may be able to make the trip on a future occasion, so that a conjoint Meeting of British and American Otologists in London may be possible.

* * *

The Semon Lecture, 1920-21 (University of London), will be delivered by Dr W. Jobson Horne, M.A., M.D. (President of the Laryngological Section of the Royal Society of Medicine), on Tuesday, 5th July, at 5 P.M., in the Lecture Hall of the Royal Society of Medicine, 1 Wimpole Street, W. 1. The subject of the Lecture is—"The Relationship of the Larynx to Pulmonary Tuberculosis." The Chair will be taken by Herbert Tilley, Esq., F.R.C.S.

* * *

THE MEMORY OF MORELL MACKENZIE.

The Summer Congress of the Section of Laryngology (Royal Society of Medicine) was marked, this year, by a very touching and charming ceremony. Dr Irwin Moore has chanced to acquire the house at Wargrave on the Thames, which was the week-end cottage of Morell Mackenzie, who is buried close to the lych-gate of the churchyard in the little Berkshire village. On Sunday, the 5th June, in lovely summer weather, some thirty well-known laryngologists were

General Notes

most hospitably entertained to luncheon at Wargrave by Dr Irwin Moore. Afterwards, as a muffled peal rang from the tower of St Mary's Church, the small band of disciples marched to the church gate, headed by Mr Hovell and Dr Donelan, former assistants of Sir Morell Mackenzie, carrying a laurel wreath presented by the Section of Laryngology. A special service, with full choir, was held in the churchyard by the Rev. S. M. Winter, and then the two old assistants placed in position the wreath bearing the following inscription :—

"To the Memory of Sir Morell Mackenzie, the Father of British Laryngology, from British and Foreign Laryngologists attending the 3rd Annual Summer Meeting of the Section of Laryngology, Royal Society of Medicine, June 2nd, 3rd, and 4th, 1921."

Short addresses followed. Mr Hovell, who spoke from intimate knowledge of Mackenzie's personal characteristics, quoted examples of his kindness and consideration, and recalled the courage of his life-long fight against the poor health caused by asthma. Sir St Clair Thomson dwelt upon the enduring value of his scientific and literary attainments, and pointed out that Mackenzie discovered all that was possible in laryngology forty years ago. He expressed the opinion that, had X-rays and electric lighting been then available, there is little doubt that Mackenzie would have forestalled the recent developments of endoscopy. When called to Berlin his German colleagues acknowledged that he was head and shoulders above any European laryngologist of the time. Although written forty years ago his text-book was a mine of knowledge in which every laryngologist should still dig. He was a man of culture, with many interests and tastes, a linguist, and a strenuous worker. Sir James Dundas Grant recorded some incidents of his association with the master, and mentioned that a commemorative tablet had been placed on the house in Leytonstone where he was born.

The touching little ceremony was made almost historical by the presence, amidst these thirty bare-headed disciples of the "father of British laryngology," of Mr Gustave Garcia, the son of Manuel Garcia, who in 1854 invented the laryngoscope.

Those who took part in paying this tribute will not easily forget the picturesque surroundings, the perfect weather, and the good taste and sincerity of the ceremony.

Not only did the original idea emanate from Dr Irwin Moore, but the whole design and every detail was his planning. His thoughtful and gracious hospitality was warmly appreciated.

* * *

The Summer Meeting of the Société Belge d'Oto-Rhino-Laryngologie will be held in Brussels on the 9th and 10th July, commencing on Saturday, the 9th, at three o'clock. On Sunday, the 10th, there will be both a morning and an afternoon sitting, and on Monday there is generally an excursion.

Visitors who propose attending should write to the Secretary, Dr A. Heyninx, 18 rue Defacqz, Bruxelles.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

DIATHERMY IN INOPERABLE PHARYNGEAL AND EPI-LARYNGEAL MALIGNANCY: ITS OBJECTIVES AND LIMITATIONS, WITH A REVIEW OF CASES.*

By SIR WILLIAM MILLIGAN, M.D.

IN inoperable malignant disease of the mouth, the tongue, the palate, the tonsillar area and the epilaryngeal region, diathermy is a valuable aid in our therapeutic armamentarium, not because we can necessarily look forward to curing the disease, but because we can be almost certain of improving the local condition, relieving symptoms, and, in a general way, helping the patients' well-being. The eradication of the primary focus of disease frequently leads to considerable prolongation of life associated with comparative comfort.

Secondary deposits, glandular or otherwise, are not influenced in any way, but these deposits are at times amenable to surgical procedures. All that can be expected in these otherwise hopeless cases is relief, sometimes, it is true, only temporary, but at other times of considerable duration. I claim no cures in the strict sense of the term although I have had cases free from active symptoms for several years. Recognising the severity of the cases and the limitations of the treatment the risks of its application are slight, the benefits attained considerable.

Malignant cells, possessing as they do a lower vitality than normal cells, are comparatively easily destroyed as the result of the coagulation of the tissues following the introduction of the

* Paper read at the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, 3rd June 1921.

William Milligan

“active” electrode, while, at the same time, lymphatics and small blood-vessels are blocked; consequently the dissemination of the cancer cell is more or less prevented. The most favourable cases are those in which there is no secondary glandular involvement, and this I think explains the good results in palate cases—results which are quite remarkable. The sterilising effect of the treatment upon the tissues is also very advantageous to the patient, septic absorption being materially lessened if not actually altogether stopped.

A disadvantage of diathermy is the risk of secondary hæmorrhage, and this complication must not be ignored. In my own experience I have only met with it on two occasions, and in neither case was it really severe. I am careful, however, when coagulation has to be effected in the neighbourhood of important blood-vessels to perform a preliminary ligature of, for example, the external carotid, the lingual, etc. One must always bear in mind that while the density of the current may be sufficient to coagulate fixed tissues, and even the circulating blood in capillaries and small blood-vessels, it is insufficient to cause coagulation in larger vessels, with the result that as the coagulated tissue subsequently sloughs severe secondary hæmorrhage may take place.

Another point of considerable practical importance is the question of a preliminary tracheotomy in cases where the growth to be coagulated is situated in the neighbourhood of the larynx. In faucial growths I have never found it necessary, but in growths involving the aryepiglottic folds, the epiglottis and the pyriform sinus, it should invariably be done.

The heat generated, and the possible scalding of the mucosa by escaping steam, frequently cause a rapid œdema of the loose cellular tissue in this situation with a possibly acutely developing œdema of the glottis. It is wiser to anticipate this occurrence than to be sent for in the middle of the night to provide an air-way for the patient.

In almost every case considerable relief to such symptoms as pain, odynphagia, dysphagia, etc., has been afforded, the condition of the local lesion has vastly improved, and in a few cases would appear to have been cured. One case of inoperable epithelioma of the palate is alive and well $3\frac{1}{2}$ years since first operated upon, another $3\frac{1}{4}$, and another $2\frac{1}{2}$ years. In only two cases did secondary hæmorrhage occur, one a nasal case and the other a tonsil case.

Diathermy in Inoperable Malignancy

Septic broncho-pneumonia followed in one of the laryngeal cases, and in one posterior pharyngeal wall case death took place from heart failure thirty-six hours after operation.

While it is true that the heat, generated as the result of the resistance of the tissues to the passage of the current, sterilises them, it is essential that precautions be taken to render the area of operation as aseptic as possible. With this end in view the mouth should be carefully cleansed, carious teeth extracted, and nasal or nasopharyngeal suppuration attended to.

When the growth to be attacked is situated in the nasopharynx I am in the habit of slinging the soft palate forwards with rubber bands passed through the nasal cavities and tied over the incisor teeth.

To prevent burning of the skin at the site of attachment of the indifferent electrode which I always place upon the upper arm, twenty-six layers of lint soaked in saline are bound smoothly and evenly round the arm and fixed by a bandage. In the event of the operation being likely to last long it is better to moisten the pad from time to time. I am not, however, in favour of prolonged applications, but rather recommend several sittings of short duration.

The patients requiring this particular type of treatment are not, as a rule, in good condition, suffering as they frequently do from inanition, sepsis, toxæmia, and so forth. In other words the coagulation of the growth should be done "in stages."

The particular type of "active" electrode which should be employed, must be left to individual experience and with special reference to the size and situation of the growth. In large growths I am in favour of using an "active" electrode fitted with a number of fine spikes as the coagulation extends more deeply than when flat or button-shaped electrodes are used.

The strength of the current will also have to vary with the size of the growth. For medium sized growths 800-900 milliamperes are sufficient, for larger growths currents of from 1-2 ampères should be used. A point of great practical importance is that the current should be gradually increased in strength from zero upwards so as to retard the drying of the tissues in close proximity to the electrode. In this way, coagulation will be found to extend more deeply.

Severe pain following immediately upon the application of the "active" electrode is not usual, but about the eighth to the twelfth day, when the slough is separating and a raw surface is

William Milligan

exposed, it may be considerable. To relieve it I have found a 20 per cent. application of orthoform useful.

The advantages of diathermy are :—

- (1) That it is of value when ordinary surgical procedures are contra-indicated.
- (2) That its employment does not produce much, if any, shock.
- (3) That with reasonable care it is a bloodless performance.
- (4) That it has the merit of sterilising the tissues, blocking vascular and lymphatic vessels, and thus preventing the dissemination of the cancer cell.
- (5) That it frequently affords relief from painful symptoms and mechanical difficulties in cases surgically hopeless.
- (6) Septic and broncho-pneumonia are less frequent than after cutting operations.

The disadvantages are :—

- (1) That it destroys both healthy and diseased tissues.
- (2) That the walls of adjacent blood-vessels may become softened and secondary hæmorrhage result.
- (3) That when the skin is involved keloid cicatrices may result.

For the purposes of this communication I have analysed 50 consecutive cases in which I have employed diathermy as ordinary surgical procedures were contra-indicated either from the situation, the extent, or the fixity of the original growths. In all cases the growths were clinically malignant and, in the majority, the malignant nature of the disease was verified by microscopic examination :—

	Males.	Females.	Total.
Tonsil Cases	7	1	8
Posterior Pharyngeal Wall Epitheliomata	7	2	9
Laryngeal Cases	2	1	3
Tongue Cases	6	0	6
Hypopharyngeal Cases	0	2	2
Nasopharyngeal Cases	3	0	3
Palate Cases	6	2	8
Floor of Mouth	2	0	2
Faucial Pillars	1	0	1
Aryepiglottic Fold	1	1	2
Nose and Jaw	0	1	1
Rodent Ulcer Face	1	0	1
Lymphosarcoma of Tonsil	1	0	1
Nasal Sarcoma	0	1	1
Sarcoma of Ear	1	0	1
Sarcoma of Tonsil and Palate	1	0	1

Of the 50 cases, 39 occurred in males, 11 in females. I will not say more than that in the majority of the cases marked relief of urgent symptoms was effected, and, in a limited number, something approaching to a cure resulted.

PARALYSIS OF THE VOCAL CORDS SECONDARY TO MALIGNANT TUMOUR OF THE MAMMA.*

By A. LOGAN TURNER, M.D., F.R.C.S.E., Edinburgh.

PRESSURE upon the recurrent laryngeal branches of the vagus as the result of glandular enlargement consequent upon malignant tumour of the breast has not received much attention. Although malignant lymphatic glands in the neck and mediastinum are recognised as fairly common causes of recurrent nerve paralysis, the sequence—cancer of the mamma, secondary glandular enlargement, vocal cord paralysis—is not referred to in any of the standard text-books to which I have had access. As six cases of this nature have come to my notice during the last twelve years, I have formed the impression that if the history of the cases of vocal cord paralysis in women were more carefully inquired into, the sequence might be elicited in a larger proportion of patients.

The six patients who form the text of this paper were seen in consultation on account of the recent development of hoarseness. Three, were unmarried women aged 35, 37, and 76 respectively: three were married women of 45, 63, and 69 years of age. The primary tumour affected the right breast in three and the left breast in three of the cases, and in each instance the breast and the axillary glands of the same side had been removed. One was a case of melanotic sarcoma, and five were cases of scirrhus cancer.

The hoarseness developed at varying periods after the removal of the primary growth. In the case of the sarcoma, the symptom was noticed eight months after the breast had been removed. Of the five cases of scirrhus cancer, hoarseness developed at periods varying from $2\frac{1}{2}$ to 5 years, the average period in the five cases being 3 years and 6 months. In no instance had there been any operative interference upon enlarged cervical glands.

The right vocal cord was paralysed in one case (sarcoma of the right breast), while in each of the other five the left vocal cord was observed to be in the cadaveric position. It is

* Reports for the years 1919 and 1920 from the Ear and Throat Department of the Royal Infirmary, Edinburgh, under the care of A. Logan Turner, M.D., F.R.C.S.E. Read at the Section of Laryngology, 3rd June 1921.

A. Logan Turner

evident, therefore, that the paralysed cord was not, in every instance, on the same side as the primary tumour, as the right breast was affected in two of the five cases of scirrhus. The following table will show graphically the condition that was present :—

Mammary Tumour.			Paralysis.		
Right, 3 Cases	.	.	Sarcoma	.	R.V.C.
			Scirrhus	.	L.V.C.
			"	.	"
Left, 3 Cases	.	.	Scirrhus	.	L.V.C.
			"	.	"
			"	.	"

The paralysis was homolateral in four cases—in the case of the right mammary sarcoma, in which the right cord was affected, and in three cases of left mammary scirrhus, in which the left cord was paralysed. The paralysis was contralateral in two cases of right mammary scirrhus, the left vocal cord being paralysed in both.

One further clinical observation must be recorded. In the five cases of scirrhus cancer, the supraclavicular lymphatic glands were found to be secondarily involved at the time of the laryngeal examination; in four instances the enlargement was homolateral, in one it was contralateral. In the case of sarcoma, no enlarged supraclavicular glands were seen, nor could they be palpated.

It is unfortunate that a more thorough clinical examination, combined with an X-ray investigation of the thorax, was not possible when the patients presented themselves for laryngoscopic examination. Further, no *post-mortem* inspection was obtained in any of them. In forming our conclusions, therefore, we are obliged to rely upon the somewhat limited observations which have just been recorded.

The three main points of interest in the study of these cases are centred in, (1) The distribution of the efferent lymphatic vessels of the mamma and the mode of permeation of the cancer cells. (2) The elucidation of the locality or lymph gland area in which the recurrent laryngeal nerve had become involved. (3) The explanation of the occurrence of a contralateral paralysis.

It may be assumed that the paralysis was the result of pressure upon the recurrent laryngeal nerve by lymphatic glands enlarged in consequence of secondary deposits. The frequency with which the left vocal cord was paralysed

Paralysis of the Vocal Cords

naturally suggests the involvement of the corresponding nerve somewhere in its course in the mediastinum. In two instances, however, there was a possibility that the paralysis might have been due to the enlarged supra-clavicular glands pressing upon the recurrent nerve in its cervical portion.

We shall endeavour to show by a study of the efferent lymphatic channels of the breast and from the mode of permeation of the cancer cells, that the supra-clavicular glands form an important link in the lymphatic chain along which the cancer cells disseminate, and that, in all probability, they do not exert pressure directly upon the recurrent nerve in the neck.

The homolateral efferent lymphatics of the mamma may first be dealt with. They pass mainly in two directions, externally to the axilla and internally into the anterior mediastinum (Fig. 1). It is unnecessary for our present purpose to describe their mode of origin or to detail minutely their course. The collecting trunks which pass outwards enter the axillary lymphatic glands which are arranged as internal, external, and central sub-groups, according to their relation to the different walls of the space. At the extreme apex of the axilla lie the subclavian glands, situated below the clavicle and behind the costocoracoid membrane. The subclavian glands receive almost all the efferents of the axillary sub-groups, and in addition they may receive directly from the mamma lymphatic trunks which do not pass through the other axillary groups. The subclavian glands, in turn, give off numerous efferent vessels which, after forming an infra-clavicular plexus, unite into a single subclavian trunk which discharges its contents into the venous circulation at the junction of the subclavian and internal jugular veins.

Some of the efferent vessels of the axillary sub-groups, however, do not pass into the subclavian glands, but, passing superficially to the clavicle, ascend directly to the supra-clavicular glands, in which they terminate. Oelsner regards this as an important and constant arrangement (Fig. 1).

The lymphatic trunks which drain the inner portion of the mamma perforate the pectoralis major muscle and the internal intercostals and enter the glands of the internal mammary chain (Fig. 1). The internal mammary chain or retro-sternal glands lie on each side of the sternum behind the costal cartilages, separated from the mediastinal pleura by a fine layer of cellular tissue. The efferent duct from these glands, lying in close contact with the dome of the pleura, terminates by

A. Logan Turner

entering the venous circulation at the root of the neck. Some aberrant efferents of the retro-sternal glands, however, pass over the clavicle and drain directly into the supra-clavicular glands.

It is evident from the foregoing description that the supra-clavicular glands constitute an important factor in the lymphatic drainage of the mamma. They lie immediately above the clavicle and below the posterior belly of the omo-hyoid muscle. A fairly constant gland in the group is somewhat deeply placed in the angle between the inner end of the clavicle and the posterior edge of the sterno-mastoid muscle, and close to the subclavian artery. In two of the cases in the series, this gland was found to be enlarged. The efferent vessels of the supra-clavicular group unite with the efferents of the sterno-mastoid glands and form a common trunk which enters the confluence of the subclavian and internal jugular veins.

It is necessary, however, to refer at this point to certain of the afferent vessels of the supra-clavicular glands other than those already alluded to as derived directly from the axillary glands and the glands of the internal mammary chain, because, when the supra-clavicular glands become the seat of cancerous infection, extension of the disease may take place from them by permeation along any or all of their afferent ducts. The frequency with which the supra-clavicular glands become secondarily affected in cases of cancer of the mamma has been pointed out recently by W. Sampson Handley in his paper upon *Lines of Advance in the Surgery of Breast Cancer*. In a group of 26 cases which had been operated upon for mammary cancer, Sampson Handley found recurrence of the disease in the supra-clavicular glands in nine instances and in the retro-sternal glands in five.

Of the afferent trunks not previously alluded to, which enter the supra-clavicular glands, and which relate specially to the present subject, are the efferents of the pre-tracheal glands of the thorax, and the efferent trunks which arise from a small glandular chain which accompanies the recurrent laryngeal nerve. In dealing with the question of the thoracic permeation of cancer cells from the infected supra-clavicular glands, Sampson Handley writes as follows:—"It seems doubtful whether any direct lymphatic vascular connection exists between the pre-tracheal glands of the thorax and the supra-clavicular glands. In many cases, the pre-tracheal efferent trunks discharge directly into the great veins and thus the avenue of

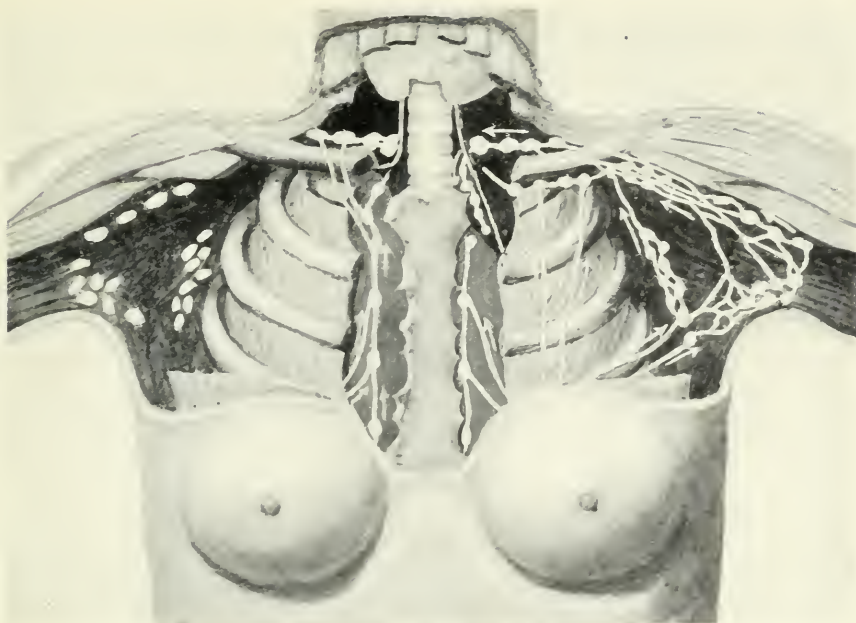


FIG. 1.—Illustrates lymphatic drainage of mamma ; the retro-sternal glands (R.), and the glands accompanying recurrent laryngeal nerve (L.).

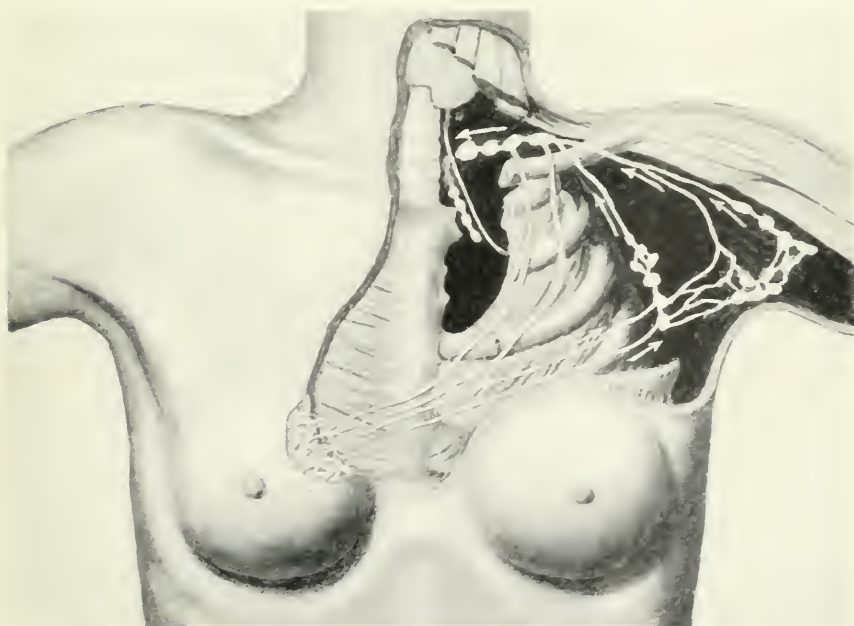


FIG. 2.—Illustrates path of infection from right mamma and manner of implication of left recurrent laryngeal nerve.

Paralysis of the Vocal Cords

permeation into them is cut off. It would seem that the only constant lymph-vascular connection of the supra-clavicular glands with the thorax is by way of the efferents of the small recurrent laryngeal chain of glands" (Fig. 1).

A study of the above anatomical and pathological data not only reveals the homolateral lymphatic pathways of infection from a cancerous mamma, but it indicates also the area in which the causative factor of the laryngeal paralysis is to be found, when the vocal cord is paralysed on the same side as the affected breast. As already indicated, there are 4 cases of this variety of paralysis in the series.

CASE I. was an unmarried woman, aged 35, with a melanotic sarcoma of the right breast, which was removed by Mr Alexander Miles in June 1908. In November 1908, sarcomatous glands were removed from the right axilla: at the same time, numerous pigmented spots were observed on the chest and abdomen. In March 1909, her larynx was examined on account of hoarseness: the right vocal cord was in the cadaveric position. No enlarged glands could be felt above the right clavicle. At the apex of the right lung, below the clavicle, there was dullness on percussion and a marked diminution of the breath sounds.

The explanation of the recurrent nerve paralysis in this case is probably to be found in a secondary invasion of the glands of the internal mammary chain (retro-sternal) associated with peri-glandular infiltration of the adjacent apical pleura, followed by involvement of the recurrent laryngeal nerve in its immediate neighbourhood. (See Fig. 1, right side.)

In Cases II., III., and IV., scirrhus of the left mamma and left vocal cord paralysis, a different explanation must be sought for.

CASE II.—Miss K., aged 76, had had her left breast removed a few years before her hoarseness developed. She could not recall the exact date. She had suffered from hoarseness for four months, and she had noticed a tendency to slight breathlessness on exertion. A hard, more or less fixed gland could be palpated above the inner end of the left clavicle and somewhat under cover of the posterior edge of the sterno-mastoid muscle: the trachea was displaced slightly to the right. There was an area of dullness to the left of the middle line below the clavicle. The left vocal cord was in the cadaveric position.

CASE III.—Mrs S., aged 69, had had her left mamma and axillary glands removed by Mr Miles in June 1911. In

A. Logan Turner

September 1915, her larynx was examined on account of hoarseness of four months' duration. There was an enlarged gland above the left clavicle, and the left vocal cord was immobile in the cadaveric position.

CASE IV.—Mrs MacK., aged 63, had her left breast and axillary glands removed in 1911. On 6th November 1914, her larynx was examined on account of hoarseness. The left supra-clavicular glands were enlarged and the left vocal cord was in the cadaveric position.

These cases illustrate, as Sampson Handley has pointed out, the tendency for carcinoma of the breast to involve at a later stage the supra-clavicular glands. It is probable that in all of them pressure was exerted upon the left recurrent laryngeal nerve owing to enlargement of the chain of lymphatic glands accompanying the nerve in the thorax, as the result of permeation of the cancer cells along their efferent ducts from the secondarily infected supra-clavicular glands. (See Fig. 1, left side.) It is possible, however, that in Case II., the large infiltrated gland above the inner end of the clavicle might have exerted pressure directly upon the recurrent laryngeal nerve after it had entered the neck. The pathway of infection from the mamma in these cases, briefly stated, was probably through the axillary and supra-clavicular glands and thence by permeation into the intra-thoracic glands accompanying the recurrent laryngeal nerve.

An explanation of the contralateral paralysis found in Cases V. and VI. must now be sought for. In both, a scirrhus cancer had been removed from the right mamma, and, subsequently, paralysis of the left vocal cord developed. It is necessary, therefore, to study the inter-communication of the mammary lymphatics of the two sides of the chest. In investigating the subject, consideration must be given to (*a*) the distribution of the lymphatic vessels which drain the cutaneous covering of the anterior wall of the chest; (*b*) certain cutaneous lymphatic vessels superficial to the periphery of the mamma; (*c*) the anastomoses which exist between the cutaneous and mammary lymphatics.

(*a*) The principal lymphatic channel from the anterior cutaneous wall of the thorax drains into the homolateral axillary glands and need not be further considered. Certain accessory channels, however, exist. Collecting trunks perforate the intercostal spaces and enter the retro-sternal or glands of the

Paralysis of the Vocal Cords

internal mammary chain. Others pass upwards in front of the clavicle and terminate in the supra-clavicular glands of the same side. Again, when the cutaneous lymphatic channels are injected at a little distance from the mesial plane, the injection material is seen to pass into the supra-clavicular glands of the *opposite side* (Fig. 2). While the decussation of collecting trunks is not to be regarded as a constant occurrence—Oelsner met with it twice in nine subjects—it must be borne in mind that when the chief axillary channel becomes blocked from neoplastic thrombosis, the accessory lymphatic channels become of greater importance and vessels may appear, which are anatomically abnormal.

(b) The cutaneous lymphatics overlying the periphery of the breast structure are in no way distinguishable from the cutaneous lymphatics of the adjacent region, and both sets terminate in collecting trunks which carry the lymph from the integuments of the anterior part of the thoracic wall. Those which arise near the inner periphery of the mamma have been shown by Rieffel and Oelsner to terminate in the axillary glands of the *opposite side* (Fig. 2).

(c) There is anatomical evidence, too, that the peripheral mammary lymphatics and the overlying and adjacent cutaneous lymph-vessels are demonstrably indistinguishable and anastomose with each other. The collecting trunks which pass from these areas enter not only into the supra-clavicular and retrosternal glands of the same side, but into the supra-clavicular and axillary glands of the opposite side of the body. Hence there is a pathway for contra-lateral lymphatic infection.

In the light of the above anatomical description, an explanation may be found for the contralateral vocal cord paralysis in CASE V.—Mrs B., aged 45, had her right breast and axillary glands removed by Professor Caird in June 1910. In July 1913, she developed attacks of spasmodic coughing and her voice became hoarse. In October 1913, her larynx was examined. Her medical attendant furnished the information that enlarged glands could be detected in the mediastinum by the X-rays, but details were not supplied. Above the inner end of the left clavicle, a large, hard gland could be palpated. The left vocal cord was in the cadaveric position.

It may be assumed that the infection of the left supra-clavicular glands had taken place through the collecting lymphatic trunks from the inner periphery of the right mamma

A. Logan Turner

and the adjacent cutaneous tissue. The left recurrent laryngeal nerve had become involved either by direct pressure of the supra-clavicular gland at the root of the neck, as was pointed out as a possibility in Case II., or, more probably, permeation had taken place from the supra-clavicular glands into the glandular chain accompanying the left recurrent nerve, with consequent pressure upon the nerve in the thorax. On the other hand, it is possible that the left or contralateral axillary glands may have become infected first, and the supra-clavicular glands in sequence. The axilla, however, was not investigated when the laryngoscopic examination was made, and the patient made no reference to enlargement of axillary glands on the left side.

CASE VI.—The second of the two cases of contralateral paralysis is not so readily explainable upon the data which are provided. Miss MacN., aged 37, had a large diffuse scirrhus of the right breast, which was removed along with the axillary glands in February 1908 by Sir Harold Stiles. Her larynx was examined in October 1910, on account of hoarseness of two and a half months' duration. Enlarged, hard glands were found above the *right* clavicle, and the *left* vocal cord was in the cadaveric position. No glandular enlargement was detected above the *left* clavicle.

It is possible that, in this case, if an examination of the patient had been made while she was in bed, supplemented by an X-ray plate, some enlargement of the left supra-clavicular glands situated more deeply might have been detected. In this event, cancer permeation would have extended from them to the thoracic glands accompanying the left recurrent laryngeal nerve, and so produced the paralysis in the same way as in Case V. In the absence of sufficient data, however, the true explanation of the cause of the paralysis of the left vocal cord in Case VI. must be left undetermined.

The cases recorded here are not only of interest to the laryngologist, but also to the general surgeon, as they illustrate the great tendency for malignant disease of the breast to secondarily infect the supra-clavicular glands.

Poirier and Cunéo, *The Lymphatics*; translated and edited by Cecil H. Leaf, 1905. A. Most, *Die Topographie des Lymphgefäßapparates*, 1906. P. Bartels, *Das Lymphgefäßsystem*, 1909. W. Sampson Handley, "Lines of Advance in the Surgery of Breast Cancer," *Brit. Med. Journ.*, 8th Jan. 1921.

CLINICAL RECORD

AN INTRA-CRANIAL COMPLICATION OF CHRONIC MIDDLE EAR SUPPURATION.

By F. G. WRIGLEY, M.D., Hon. Surgeon to the Manchester Ear Hospital, Assistant Surgical Officer to the Aural Department, the Manchester Royal Infirmary.

THE patient, a girl aged 17 years, was first seen on 15th March 1920.

History of Illness.—At the age of ten she had a severe attack of measles, which left her with a discharge from the left ear. No regular treatment was carried out except occasional syringing and the use of hydrogen peroxide drops. The discharge had continued on and off ever since, occasionally being very profuse, but giving rise to no pain or other disturbance. On 13th March she complained of severe pain in the left temporal region, which became worse on the 14th when she vomited twice and had a rigor. On the 15th the vomiting was repeated and she had two rigors. Constipation was a marked feature. On examination the following condition was found :—

General Condition.—She was quite conscious, the mental condition being perfectly normal. She was complaining of dizziness, temporal headache, and pain in the left eye. The tongue was foul and the breath offensive. Constipation had been present for four or five days. The reflexes were normal; no Babinski's sign; Kernig's sign was present in a slight degree.

Eyes.—A slight and very quick nystagmus was present, more noticeable on turning the eyes away from the affected side. The nystagmus was increased by pressure in front of the tragus, when it became very violent and of a rotatory character. There was some congestion of the optic disc on the left side. There was proptosis of the left eye and some cedema of the lower lid.

Ears.—The left meatus was filled with thick yellowish pus, and on swabbing this away the upper and posterior wall was seen to be prolapsed. There was a large perforation in the membrane through which bare and roughened bone could be felt. Any manipulation with the probe produced dizziness and nystagmus. Rinne's test was negative and bone conduction was lateralised to the left side. There was slight tenderness over the mastoid. Immediate operation was decided on and a diagnosis of circumscribed labyrinthitis and lateral sinus thrombosis was made.

Operation.—The mastoid cortex contained pus in slight quantities,

F. G. Wrigley

and on reaching the antrum there was a gush of foul pus which was obviously under tension. Bone was gouged away and the lateral sinus freely exposed; this was bathed in pus and partly covered with granulation tissue. The sinus was then exposed until normal wall was reached and a hypodermic needle inserted into the lumen. What appeared to be normal blood was drawn off. Nevertheless as it appeared probable that the sinus was thrombosed an incision was made in the wall, which resulted in free hæmorrhage. A little difficulty was experienced in stopping this, and before it was controlled a clot about three-quarters of an inch in length was expelled from the opening. On examining this it was found to be undergoing disintegration. The operation was stopped at this stage, it being intended to complete the radical operation later.

Progress.—The general symptoms remained about the same for thirty-six hours, the temperature keeping high, and during that time there were three rigors, the temperature being 104 and rather above on each occasion. The wound was then dressed under a general anæsthetic, and the packing partly removed from the sinus. After this the rigors ceased, and the proptosis began to get less, and finally disappeared in ten days. The temperature was high at times but with remissions, and this was considered to be due to absorption from the middle ear. It was therefore decided to complete the radical mastoid operation. This was done nine days after the first operation, and a large fistula was found in the external semicircular canal; but as it did not appear to have involved the membranous labyrinth, it was left untouched. No ossicles were found, and the inner wall of the middle ear appeared healthy. Convalescence after this was uneventful, the temperature becoming normal in about forty-eight hours. The wound was slow in healing, but was epithelialised in six months' time.

I am inclined to regard this as a case of cavernous sinus thrombosis. The rigors and expulsion of clot point definitely to thrombosis of some sinus, and the free hæmorrhage from the lateral sinus negatives it as the diseased vessel. The proptosis and œdema of the eyelid both suggest the cavernous sinus as the site of the thrombus. The fact that the clot was not expelled till after free hæmorrhage from the lateral sinus had taken place suggests that it may have been dislodged by the back pressure caused by the rush of blood; and in that case must have reached the lateral sinus by way of the superior or inferior petrosal sinus. The interesting point about the case is that if the bleeding had been more easily controlled the clot would not have been expelled, and

Chronic Middle Ear Suppuration

in that case the illness would, in all probability, have terminated fatally. This seems to point to the possibility of some cases of thrombosis of the cavernous sinus being treated in this manner, though the difficulty would be to know when the bleeding should be stopped. A series of four cases of cavernous sinus thrombosis was published by Dr T. Ritchie Rodger in *The Journal of Laryngology*, April 1921, in one of which this line of treatment was followed, and Dr Rodger suggests the possibility of it being adopted more frequently.

CRITICAL REVIEW

VARIOUS THEORIES OF HEARING.

By ALBERT A. GRAY, M.D., C.M., F.R.F.P.S.

FROM time to time interest is aroused in the minds of anatomists, physiologists, psychologists, and otologists as to the physiological and physical processes which occur in the sense of hearing, similar to the interest which is taken in the sense of sight. In the present paper an attempt will be made to give the reader some ideas which support the various theories of hearing or militate against their acceptance. It is, of course, impossible within the limits of a short review to give the details of every theory which has been advanced. This paper is only intended to help the reader in forming a judgment as to the probable correctness or incorrectness of the various speculations.

A broad and, indeed, fundamental line of distinction separates the various theories of hearing into two classes. To one class belong those theories which seek to prove that, when analysis of sound occurs, the analysis takes place in the cochlea; the other class of theories holds that such analysis occurs in the brain.

Helmholtz was the first to suggest definitely that analysis occurred in the cochlea; although Cotugno had already some such conception in his mind, the knowledge of physics, physiology, and anatomy at his time was too limited to permit of the enunciation of a really scientific theory. Rutherford, in his "telephone theory," as it has been termed, definitely stated his opinion that the analysis of sound takes place in the brain. It should be noted, however, that though he claimed the theory as his own it differs in no essential feature from that of Voltolini, who suggested it some years before Rutherford.

All theories of hearing come under one of these two classes, which may be distinguished, for purposes of brevity, as (1) the class of cochlear analysis theories, and (2) the class of brain analysis theories. It is obviously important to consider first the evidence supporting or adverse to each class respectively.

Since, in all theories of any kind, it must be admitted that nerve impulses are conducted from the cochlea to the brain, the first step is to inquire, from our knowledge of the physiology of the conduction of nerve impulses, which of the above two classes is more likely to be correct. In this aspect of the subject no words need be wasted in the consideration of the cochlear analysis theories. All that they demand is in complete harmony with the known physiological laws of nerve conduction. Thus, the sound is analysed into its simple constituents,

Various Theories of Hearing

so far as there is analysis of the sound, by physical means in some structure or structures in the cochlea; the result is that certain nerve-endings, or groups of nerve-endings are stimulated, and this stimulation is transmitted to the brain by nerve-fibres according to the ordinary physiological laws of nerve-conduction, just as a stimulus applied to the nerve-endings in the skin is carried by the nerves of common sensation. That is to say, there is no question of each sound vibration being represented in its frequency and quality by a corresponding nerve impulse. All that the cochlear analysis theories demand in this particular respect is that, given that a certain nerve-fibre or group of nerve-fibres are stimulated, a sound of a certain pitch and quality will be perceived by the brain.

The question becomes much more difficult to answer from the point of view of the "brain-analysis" theories. If analysis of sound takes place in the brain, then every sound vibration must be transformed by the neuro-epithelium of the cochlea into nerve impulses, each of which must represent with the utmost faithfulness the exact frequency and phase characteristic of the sound vibrations. Furthermore, each of these impulses must be transmitted exactly and without the slightest confusion either of frequency or character up the nerve-fibres, through the ganglion cells of the ganglion spirale, along other nerve-fibres into other nerve-cells in the central nervous system, then along more nerve-fibres, until ultimately they reach the cells of the central cortex, still corresponding in every respect of frequency and phase to the sound-vibrations which produced them. The question then arises, is the physiological evidence in favour of this possibility or is it against it?

Let us view the matter first in regard to frequency alone, leaving out for the present the phase or quality of the stimuli; that is to say, we shall consider the conditions when one pure simple tone is sounded. In this case each wave resembles exactly in form those preceding and those succeeding it. Consequently the nerve-impulses would all be alike. Much experimental work has been done by physiologists in this connection; and, without going into detail, it may be stated that it has been found that the highest number of stimuli which can pass along a nerve without undergoing fusion is 1500 per second. When, however, the stimuli have to pass through a nerve-cell the number cannot exceed 300 per second. These figures are taken from experimental evidence, and if they hold true in natural conditions, and are equally true of all nerves, then all notes of a frequency of above 300 per second could not be distinguished from one another, or at least could not be recognised according to their pitch. This, of course, is not in accordance with the facts of audition, for the ear discriminates differences in pitch most accurately in those tones which correspond

Albert A. Gray

to vibration frequencies in the neighbourhood of 300 vibrations per second, and can discriminate difference in pitch, though less accurately, in the case of pure tones of several thousands per second.

It may, of course, be objected that these figures only apply to evidence obtained under unnatural conditions, and that, for the most part, the experiments were made upon motor nerves. There is no doubt that these objections are to a certain extent justifiable, but an impartial judge would be more satisfied with the objections if those who support the brain analysis theories would bring forward *any evidence whatsoever*, either experimental or other, that nerve-fibres with their associated nerve-cells could transmit stimuli of frequencies greater than 300 per second without their undergoing fusion. Even in the case of simple pure tones, therefore, such evidence as is available is against the view that each vibration is represented by a corresponding nerve-impulse.

It is, however, when we come to consider the question of compound tones that the difficulty of accepting the brain analysis theories becomes greatest. In the case of a simple pure tone, as has been shown above according to the brain analysis theories, nerve-impulses exactly the same in number as the vibration frequency of the tone pass along the nerve-fibres and through the various nerve-cells to the brain. In that particular case each impulse is exactly similar in form to those that precede it and succeed it, because the stimuli producing the nerve-impulses are exactly similar. But when a compound tone is sounded a much more complex state of affairs occurs. For in this case no two successive stimuli are alike. That is to say, that if we represent the rarefactions and condensations caused by the sound vibrations in the conventional form of a succession of waves, then each wave will differ in shape from that which precedes and from that which succeeds it. Now if the compound tone is analysed in the brain, then it appears to the writer that each of the nerve-impulses must represent exactly in intensity and time the stimulus which it receives from the sound-vibrations, because the amplitude of the vibration determines the intensity of the stimulus. And it is to be noted that this exact relationship of the nerve-impulse to the sound wave must be maintained not only along the nerve-fibres, but also through the various nerve-cells through which the impulses pass. For, if the brain analyses the compound tone, then any disturbance of this relationship would result either in the compound tone not being analysed at all or else in the tone being analysed incorrectly.

We are therefore driven to the conclusion either that the nerve-impulses in the case of both simple and compound tones must represent exactly the variations in pressure in the air, however complex, which are caused by the sound vibrations, and that these nerve-impulses are

Various Theories of Hearing

transmitted unchanged and unconfused through the nerve-fibres and nerve-cells to the brain, or that analysis does not take place in the brain at all but somewhere in the peripheral end-organ.

Now it cannot be stated positively that such transmission and analysis of nerve-impulses cannot occur. All the evidence that physiologists have obtained in the study of the transmission of nerve-impulses, however, is strongly against such a possibility (*vide supra*), even in the case of a simple tone; and, of course, that evidence acquires very much greater weight in the case of a compound tone.

But there is other physiological evidence of a striking character in favour of the view that analysis takes place in the cochlea. Wittmaack¹ subjected animals for long periods of time to hearing certain notes of different pitch. He then killed the animals, made sections of the cochlea and examined these under the microscope. He found as a result that pathological changes had occurred in the neuro-epithelium and ganglion spirale of the cochlea. The area of these changes varied in position according to the note sounded. In the case of low tones the changes were found in the apex of the cochlea, and in the case of high tones, on the other hand, they were found near the base of the cochlea. What adds weight to the value of Wittmaack's investigations is the fact that they were confirmed by Siebenmann.

In regard to the physiological aspect of the subject, therefore, it may be said that the evidence obtainable is very strongly in favour of the view that analysis takes place in the cochlea and not in the brain.

When considered from the anatomical point of view the question as to whether compound tones are analysed in the cochlea or in the brain, the subject, it must be admitted, is largely a matter of opinion. The first and most obvious feature about the structures contained in the cochlea is their remarkable complexity, and the curiously regular change that takes place in passing from the base to the apex of the cochlea. Thus the ligamentum spirale is largest and most fibrous in the basal end of the ductus cochlearis, and these qualities gradually and regularly become less pronounced towards the apex. The breadth of the basilar membrane also gradually increases on passing from base to apex. Similar changes occur in other structures contained in the cochlea.

These anatomical features have been regarded by most investigators as supporting the view that tones are analysed in the cochlea. If the sound vibrations are merely to be converted into nerve-stimuli of similar character throughout the neuro-epithelium of the cochlea, why should these varying relationships in the dimensions of the structures be necessary? What is of particular significance is the coincident existence, as pointed out by the present writer, of two factors which would

Albert A. Gray

render the basal portions of the basilar membrane responsive to notes of high pitch, and the apical portion responsive to notes of low pitch. These two factors are, the increasing length of the basilar membrane and the diminishing size of the ligamentum spirale on passing from base to apex of the cochlea. Each of these factors even taken alone, as was suggested by Helmholtz and Bowman respectively, is very suggestive in itself. These writers only knew of one of the factors. The co-existing presence of both was first pointed out by the present writer, and it appears to him that it should convey considerably more weight than either factor taken separately.

Sir Arthur Keith, in support of Sir Thomas Wrightson's theory of hearing, has attempted to explain these and other anatomical facts by assuming that they are "designed to deal with displacements which vary in amount and rapidity." He has also made careful measurements of the sectional areas of the scala vestibuli and scala tympani in different regions of the human cochlea, and considers that these lend support to the theory to which reference has just been made.

But it should be remembered that at least so far as the sectional areas of the two scalæ are concerned, the relative measurements are very different in different animals. This is owing to the fact, as was demonstrated by Gray, that in a large number of mammals there is a very pronounced bulging of the floor of the scala tympani in the region of the aqueduct of the cochlea. This bulging is a vestige of the recessus perilymphaticus which is found in reptiles and birds, and is also found, though much diminished in size, in the monotreme mammal echidna (spiny ant-eater). It is hardly safe, therefore, to consider the varying relationship of the sectional areas of the two scalæ as evidence in support of any special theory of hearing.

One of the most common anatomical fallacies that is met with in papers dealing with the physiology of hearing is the idea that the labyrinth may be looked upon as a cavity with rigid walls with only two outlets which can have any significance from the point of view of the physiology of hearing. These two outlets are the oval window and the round window. Physiologists when discussing this matter have assumed that the aqueduct of the cochlea is so narrow that it may be considered negligible. The fallacy arose from ignorance of the comparative anatomy of the labyrinth. It is true that in the human subject the aqueduct of the cochlea is extremely narrow, indeed hardly more than capillary in calibre. But when a wider survey of the subject is taken a very different state of affairs is found to exist. In many mammals this structure is a comparatively wide tube² and would easily allow any changes of pressure in the labyrinth to be transmitted instantly to the interior of the cranial cavity. This is particularly true of the amphibious carnivora, *e.g.*, seal and sea-lion. In these animals the

Various Theories of Hearing

aqueduct of the cochlea at its narrowest is approximately as wide as the round or oval windows.

In its application to the present subject these facts must be admitted as supporting, on the whole, the views of those who hold that analysis takes place in the cochlea in accordance with the laws of sympathetic resonance. Where the aqueduct of the cochlea is sufficiently wide to allow the changes in pressure in the labyrinth resulting from the vibratory movements of the stapes to escape freely into the cranial cavity, then it is clear that a considerable proportion of the force of those vibrations will be lost so far as the cochlea is concerned. Now in the case of analysis of sound by sympathetic resonance a relatively very small force is necessary to set in vibration any structure the period of free vibration of which is the same as the frequency of the vibrations that are acting upon it. Expressed in acoustical terms it requires much less energy to excite free vibrations than forced vibrations. If, therefore, there are structures within the cochlea which vibrate in free vibrations in sympathy with the sound vibrations, the loss of energy which takes place through the aqueduct of the cochlea would not be felt so much as it would in the case in which the structures in the cochlea have to be set into forced vibration.

From what has been written above then it appears to the writer that the weight of the evidence is very much in favour of the view that sound waves are analysed in the cochlea in so far as they are analysed at all.

Leaving the question of the locality in which analysis of sound takes place, we may now go on to consider shortly some of the theories of hearing.

Taking first those theories which are based upon the view that sound waves are analysed in the brain, it may be said that Rinne,³ in 1865, first suggested that the basilar membrane vibrated as a whole in response to sound waves, and he was supported in 1885 by Voltolini. Rutherford took the subject up in 1886 from the same point of view, and framed what he termed the "telephone theory." It differed in no essential way from Voltolini's, and suggested that the basilar membrane vibrated as a whole. That is to say the whole membrane followed the movements of the fluid in the labyrinth which were produced by the movements of the stapes.

The movements of the whole basilar membrane were transmitted to all the hair-cells, which were stimulated by being pressed up against the tectorial membrane. The stimuli received by the hair-cells would thus correspond in frequency and character with the sound waves. These stimuli were transmitted to the brain and there analysed. This theory is very simple, but the objections to it are very great. These have already been described above and need not be repeated.

Albert A. Gray

Wrightson's theory⁴ is a further elaboration of the telephone theory. His view is that as the basilar membrane vibrates upwards and downwards the hairs of the hair-cells are pressed backwards and forwards along the under surface of the tectorial membrane. In this way varying degrees of pressure would be more delicately appreciated than would be the case were the rows of hair-cells merely pressed up again and drawn down from the tectorial membrane. Wrightson has worked out the details of his theory very elaborately, and Sir Arthur Keith gives a description of the anatomical structures and finds therein ground for support of the theory. But, as has been shown above, the anatomical facts tend rather to support the view of analysis in the cochlea.

Two theories, differing in no important respect from each other, may be considered together. These are Waller's⁵ and Ewald's.⁶ According to these physiologists, the sound vibrations in the fluids in the labyrinth cause the basilar membrane to vibrate in such a way that, so to speak, patterns are produced upon it; and these patterns, representing differences in degree of movement, are transmitted to the hair-cells which, in their turn, by pressing against the tectorial membrane cause the nerve-fibres in connection with them to transmit corresponding nerve stimuli to the brain. Both these theories, therefore, assume that analysis to a limited extent takes place in the cochlea, but that the presumably finer analysis takes place in the brain. Neither of the theories associates the formation of the patterns in the basilar membrane with the principle of sympathetic resonance. Now is it possible that such patterns could be produced in any other way than in accordance with the laws of sympathetic resonance? It appears to the present writer that if such patterns occur, they will owe their existence to the greater amplitude of movement at certain portions of the basilar membrane than at others. And it further appears to the writer that at such regions the larger amplitude of movement occurs because the basilar membrane at those regions is most nearly in sympathy with the tones which cause the greater amplitude of movement. The writer, however, would not feel competent to speak with confidence on this question. It is a subject for the mathematician and the physicist, and it would be interesting to have their views as to the possibility of such patterns being produced in the basilar membrane in the conditions under discussion in any other way save by the application of the laws of sympathetic resonance.

We now come to review very briefly those theories which assume that the analysis of sound takes place in the cochlea. It may be stated in advance that most of these theories depend upon the laws of sympathetic resonance. And this is only natural, because there is no

Various Theories of Hearing

other known method by which a compound tone can be analysed into its simple constituents.

Although previous investigators had made more or less vague suggestions clearly indicating their conception of analysis of compound tones in the cochlea on the principle of sympathetic resonance, Helmholtz was the first to give definite scientific expression to the matter. Helmholtz's view is so well known that it may be described very shortly. According to him the basilar membrane may be looked upon as a large series of fibres passing from the outer edge of the lamina spiralis to the outer wall of the cochlea. These fibres increase in length from the base to the apex of the cochlea. Each fibre has its own period of vibration, and when a note of that period reaches it from the fluids in the cochlea it will start into sympathetic vibration. As a result of this the nerve-fibre in connection with that hair-cell will be stimulated, the stimulus will reach the brain, and the sensation of a tone corresponding to the tone produced in the air will be aroused.

Put briefly, this is Helmholtz's theory of hearing. The objections to it are obvious and few investigators are willing to accept it. One of the most serious objections is that the fibres of the basilar membrane are so arranged that individual fibres could not vibrate independently. Helmholtz himself recognised this difficulty and met it by suggesting that a few fibres on each side might vibrate along with it. This explanation only places the theory in another and worse difficulty. For if several fibres undergo vibration in those circumstances, then when a pure tone is sounded we would hear that tone strongly, and a few others, higher and lower in pitch, less strongly. Another objection is that the theory does not account for the difference between a noise and a musical sound. Still another objection is that, in the cochlea, a given nerve-fibre is not associated with one given hair-cell only, or even with a single row of hair-cells, but ramifies to a varying extent up and down among the rows of hair-cells.

In view of these difficulties the present writer (Gray) has put forward a theory of hearing which embodies the physical principle of sympathetic resonance, and also introduces a new physiological principle. Briefly summarised Gray's theory is as follows:—The basilar membrane is most tense and its breadth is least in the lowest portion of the cochlea; the tension diminishes and the breadth increases regularly towards the apex of the cochlea. While, therefore, we cannot look upon it as a series of cords, we may consider that at any given point its tension and breadth are such that at that point it will vibrate more freely in response to a given note than at any other point. The membrane may vibrate as a whole or over a large area in response to that note, but the point of maximum amplitude of vibration

Albert A. Gray

will be where the tension and breadth of the membrane are most nearly in sympathy with the particular note. According to the position of the point of maximum amplitude of movement, the pitch of the note is decided. According to this view, therefore, it matters not how much of the membrane vibrates or how many nerve-fibres are stimulated, the sensation of pitch is determined by the point at which the maximum intensity of stimulation of the nerves takes place.

This theory brings the sense of hearing into the closest analogy with the sense of touch. For example, suppose the blunt point of a pencil be pressed firmly against the skin, we are conscious only of pressure at a point, not over an area of surface. And yet if we look at the skin it will be seen that many nerve-fibres must be stimulated, because the pressure is sufficient to make anæmic half a square inch of skin round the point where the pressure is applied. Therefore, either the stimuli applied to all the nerve-endings except one are ignored, or they are integrated in the central nervous system in such a way that we are only conscious of stimulation of one nerve-ending, viz., that which undergoes the maximum degree of stimulation. If this principle of maximum stimulation holds true in the sense of hearing as it does in the sense of touch, we can then understand how compound tones can be analysed by the basilar membrane by means of the laws of sympathetic resonance without accepting Helmholtz's theory.

Incidentally it may be noted that the principle of maximum stimulation formulated by the present writer may be found to be applicable to all sensation, vision among others, but the writer has never had time or opportunity to investigate the matter further. Those who are interested in the subject will find it described in the reference given.⁷

Ebbinghaus agreed in general with the Helmholtz theory, but suggested that each fibre of the basilar membrane vibrated not only in sympathy with a particular note, but also with the upper partials of that note. But this suggestion does not get over the chief difficulties of the original theory; moreover, it introduces new difficulties.

In 1897, Siebenmann⁸ put forward the theory that sound is analysed in the cochlea in accordance with the laws of sympathetic resonance, but he did not look upon the basilar membrane as the resonating structure. His view is that the tectorial membrane acts as the resonator. In this respect he is supported by Shambaugh⁹ of Chicago. The difficulty of accepting this view lies in the physical structure of the tectorial membrane. It is a common mistake to assume that the tectorial membrane in its natural condition is similar to that under which we find it in microscopic sections. Thus several writers have described it as possessing fibres running radially outwards

Various Theories of Hearing

from its attachment at the limbus. The existence of such fibres in the natural state is very doubtful, and the present writer is inclined to think that they are artefacts. In its natural condition the tectorial membrane is in its greater part gelatinous and it may be entirely so. The mere process of fixation by chemical agents tends to produce a striated or fibrous appearance, so that even when the organ is fixed and cut without dehydration in gum, we are not justified in looking upon this as being in existence during life. Of course if the tissue is dehydrated by alcohol as it usually is, then the microscopic appearances are practically valueless so far as giving an indication of the natural condition of the membrane is concerned. Apart altogether, however, from these considerations, it is difficult to see how the tectorial membrane would act any better as a resonator than the basilar membrane.

There remains one theory of hearing which, while not depending upon the principle of sympathetic resonance, yet suggests a method by which sound is analysed in the cochlea. The theory referred to is that of Max Mayer.¹⁰ According to him the sound-wave passes a certain distance up the cochlea, the distance depending upon the amplitude of the vibrations, and the intensity of the sensation of the sound will therefore depend upon the number of nerve-fibres stimulated. The pitch of the sound will be determined by the number of stimuli per second. When a compound note composed of, say, two simple tones reaches the cochlea, analysis takes place in that organ, according to this theory, in a peculiar way. When the phases are in complete agreement then the wave will travel farthest up the cochlea. This will occur the fewest number of times during the cycle, and hence the lowest note is heard; at other periods during the cycle the wave will travel a shorter distance up the cochlea, but the phenomenon will occur more frequently and consequently the higher note will be heard, and so on. This theory is difficult to explain in the short space at the writer's disposal, and those who are specially interested in it are referred to the original. It is very ingenious in conception, but one cannot help feeling some doubt as to whether all the permutations and combinations of wave-form which can be analysed by the ear could be analysed in the way described.

Hurst,¹¹ ter Kuile,¹² and Watt¹³ have advanced theories somewhat similar to that of Max Mayer, in that they suggest a wave-movement along the basilar membrane from base to apex. Watt's theory is specially interesting in that he introduces the psychological element.

Reviewing in general the whole subject, it must be admitted that though much time and thought have been devoted to it during the last twenty or thirty years, we do not appear to be any nearer a conclusion. So much is this the case that one sometimes wonders if the mental energy spent upon the problem would not be better

Albert A. Gray

employed in some more fruitful research. The study of the subject, however, offers the opportunity for excellent mental gymnastics, and further brings us into touch with spheres of intellectual activity outside our own. The most pressing need at present in the study of the theories of hearing is a definite pronouncement from physiologists as to what the nerve-fibre and nerve-cell are capable of in regard to the conductivity of impulses both in regard to their frequency and their quality. Until that question is settled the problem of hearing must remain to a large extent a matter merely of opinion.

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SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

November 5, 1920.

President—Dr JOBSON HORNE.

Leontiasis Ossium—Dr LAMBERT LACK.—Female with extensive thickening of cranial and facial bones. The association of antral suppuration with this disease was discussed by several members.

Multiple Polypi of the Deep Pharynx—Dr WM. HILL.—A man, aged 55, suffered from cough and dyspnoea with sensation of lump in throat. The polypi were removed by punch forceps and snare.

Right-sided Recurrent Paralysis with Partial Atrophy of Tongue—Mr W. G. HOWARTH.—Two cases were shown, the cause being a localised bulbar paralysis in the first, and gunshot wound in the second.

Dr WM. HILL said that as true bulbar paralysis was never unilateral and was rapidly fatal, the cause of the first case was probably a tumour in the pontine angle.

Cyst on Vocal Cord—Mr W. M. MOLLISON.—Female, aged 38. A small, white nodule at the junction of anterior and middle third of the right cord. Removed by direct method.

Giant-cell Systems in a Tonsil—Mr W. M. MOLLISON.—Boy, aged 6. Small tonsils were removed on account of enlarged glands in neck. Numerous tuberculous giant-cell systems were found in the sections.

Lympho-sarcoma of Postnasal Space—Mr C. W. M. HOPE.—Patient, aged 34, suffered from nasal obstruction and blood-stained discharge. Postnasal space filled by large bluish-red mass. Glands enlarged on both sides of neck. Successfully treated by radium and X-rays. Postnasal space now free from tumour. Glands in neck smaller.

Carcinoma of the Larynx?—Mr SOMERVILLE HASTINGS.—Woman, aged 52, with loss of voice for two years. The right vocal cord was covered by sprouting granulations. Movement of both cords good. Two Wassermann tests negative. Excision of larynx not performed owing to epileptic fits. Rapid return to normal appearance

Societies' Proceedings

under treatment with potassium iodide. Cell nests were never seen in the microscopic sections.

Lupus treated by Sodium Iodide and Ionisation—Mr DOUGLAS HARMER and Mr T. H. JUST.—The method, used in Copenhagen, consists in the use of single doses of sodium iodide (60 to 120 grs.) followed two hours later by the insertion of needles into the tissue so as to secure ionisation with the positive pole. The liberation of iodine in the tissues destroys the tubercle bacillus. The strength of the current varied from 5 to 30 ma. according to the number of needles used. It was continued for 5 to 20 minutes.

Actinomycosis of Superior Maxilla—Mr DOUGLAS HARMER and Mr T. H. JUST.—The patient was a butcher, aged 59. Treatment by vaccine and potassium iodide is having a good effect.

Large Fibrous Tumour of Cheek—Mr W. LLOYD and Dr WM. HILL.—Duration, twelve years. It was thought to be a fibrolipoma, but the microscope showed fibrous tissue only.

December 3, 1920.

President, Dr JOBSON HORNE.

Dentigerous Cyst (Follicular Odontome) of Upper Jaw—Dr DOUGLAS GUTHRIE.—The cyst was removed entire from a boy aged 9. There was a history of injury to the upper lip a few weeks previously.

Chronic Superficial Abscess of Left Frontal Sinus—Mr ARCHER RYLAND.—A boy, aged 15, complained of nasal obstruction and frontal headache for several months. Nasal polypi were removed. Two months later a painless, soft, fluctuating swelling appeared on the centre of the forehead. This was found to be an abscess connected with the left frontal sinus.

Laryngocele—Dr FREDERICK SPICER.—Male, aged 68, had been hoarse for twenty-two years, and the appearance of the larynx had never altered during that time. In quiet respiration the right cord is normal; the left is swollen and covered anteriorly by a fold of mucous membrane. The left ventricular band is thickened and corrugated. When the patient says "Ah," a smooth, globular tumour appears, filling the left ventricle and then extending across the opposite cord and blocking the airway.

The majority of members who discussed the case thought that the swelling contained air. There was some difference of opinion as to whether true prolapse of the laryngeal ventricle could ever occur.

Congenital Laryngeal Web—Mr R. A. WORTHINGTON.—A girl, aged 10, whose vocal cords in their anterior half were united

Royal Society of Medicine

by a pink, translucent web. She suffered from hoarseness, and dyspnoea on exertion.

Edema of Upper Aperture of the Larynx, for Diagnosis—

Sir JAMES DUNDAS-GRANT.—Man, aged 57, had hoarseness for two years and swelling over larynx for three weeks. The swelling was opened by a surgeon, but its contents were not examined. Although physical signs in the chest are extremely indefinite and no tubercle bacilli have been found, the diagnosis of tuberculosis is the most probable. Wassermann negative; urine normal.

Fixation of Arytenoids in Osteoarthritis —

Dr A. J. HUTCHISON.—A lady, aged 48, crippled by arthritis. Stridor and hoarseness for eighteen months. Arytenoids fixed close together, leaving only a narrow slit between the cords on respiration. Improvement after extraction of teeth, which were affected by pyorrhœa. The stridor has disappeared.

Bilateral Abductor Paralysis: Division (?) of both Recurrent Laryngeal Nerves—Dr DAN M'KENZIE.—Woman, aged 44, right thyroid lobe removed when 14, the left lobe when 40 years of age. Both vocal cords are in the position of adduction.

Paralysis of Right Recurrent Laryngeal Nerve after Thyroidectomy—Mr T. B. LAYTON.—Female, aged 45.

The discussion upon these two cases brought out the fact that the nerve injury occurred pretty frequently in operations on the thyroid gland. The opinion was expressed that the injury was caused by the surgeon's knife, and did not arise from post-operative cicatrisation.

February 4, 1921.

*President—*Dr W. JOESON HORNE.

Tumours of the Ventricles and of the Ventricular Bands—commonly called the False Cords—of the Larynx: An Epidiascopic Demonstration—Dr W. JOESON HORNE.—The demonstration was restricted to innocent tumours and granulomata, and to cases and specimens forming part of original work by the author.

The term ventricle was used to include the sacculus laryngis, or such part as may be left of that vestigial structure of anthropoid and other apes.

(1) *Eversion, prolapse, or hernia* of the mucous membrane of the ventricle. A specimen was demonstrated in which the left ala of the thyroid cartilage was involved in a gummatous necrosis, and this had led to the detachment, prolapse, and eversion of the mucous membrane lining the ventricle. The specimen demonstrated that prolapse of the ventricle was not merely a traditional theory but an entity. (2) *Solid*

Societies' Proceedings

pedunculated tumours springing from the vault of the ventricle might present at the mouth of the ventricle as a solid tumour. (3) *Pseudo-cystic tumours* springing from the vault of the ventricle may emerge from the mouth of the ventricle. (4) *True cystoma of the ventricle*, congenital in origin, but rare. Dr F. Spicer's case brought to the December meeting was probably an example.

Granulomata.—Syphilis and tuberculosis *per se* are not specifically conducive to prolapse of the mucous membrane of the ventricle, or to the development of growths within the ventricle. A well-developed gumma limited to the ventricular band may cause confusion in the differentiation of the parts and in the diagnosis.

Lipomatosis.—An enlargement or tumefaction of the ventricular band, due to a remarkable and circumscribed proliferation of fat cells amounting to a lipomatosis or fatty degeneration of the structure.

Epidiascopic Demonstration of Two Authenticated Specimens of Eversion of the Sacculus Laryngis—Dr IRWIN MOORE.—(1) *From the Museum of Guy's Hospital*—recorded by Walter Moxon as eversion of the sacculus laryngis. (2) *From the Museum of the Hospital for Diseases of the Throat, Golden Square*—recorded by Morell Mackenzie as eversion of the ventricle.

(1) In Moxon's case a pendulous tumour, semi-elliptical in shape, is seen protruding from the anterior half of the ventricular orifice and lying on the vocal cord. Moxon stated that the tumour could easily be replaced into the normal position of the sacculus laryngis, *i.e.* it could be inverted and returned behind the false vocal cord to again easily fall out of its position and reappear in the larynx as now seen. On these grounds he surmised that the tumour was the everted sacculus laryngis. Recent resection of a portion of the left thyroid ala by Professor Shattock has proved that Moxon was correct.

(2) Morell Mackenzie removed a portion of the thyroid ala and found that the sacculus laryngis was absent on the left side, and that the protruded sac seen in the lumen of the larynx could be inverted and replaced in its normal position. He states that the "left ventricle of Morgagni" was entirely everted and the right sacculus protruded from the ventricular orifice. Recent examination of this specimen shows, however, that there is no prolapse of the ventricle, and that the tumour consists of the everted sacculus laryngis.

It is necessary to discriminate between eversion of the sacculus laryngis and eversion of the ventricle, and I hope to show proof that there is no such condition as prolapse of the ventricle of Morgagni; that the only way in which eversion of the ventricle can occur is either by a tumour occurring behind or in the wall of the ventricle, pushing it or dragging it inwards into the cavity of the larynx, or as a secondary or final stage of eversion of the laryngeal sacculus.

Royal Society of Medicine

Adhesions between the Back of the Tongue and the Posterior Pharyngeal Wall—Mr NORMAN PATTERSON, F.R.C.S.—Male, aged 22. Since nine years of age had been treated for lupus. Dyspnoea on exertion. Dysphagia with hard foods. Numerous bands of scar tissue extending from the pharyngeal wall, border of soft palate and posterior pillars of the fauces, down to the base of the tongue, with small communications between the buccal cavity and the hypopharynx. Wassermann negative.

Opinions were solicited as to treatment. It was pointed out that the improvement under treatment was usually of a temporary character, stenosis tending to recur.

Report of Two Cases of Fatal Tonsillectomy—Dr A. L. MACLEOD.—CASE 1. Girl, aged 10. Enlarged tonsils and adenoids. Operation at 9.15 A.M. Anæsthetic, C_1E_2 . Seen at 12 and 2.30, quite well, no bleeding. Seen at 4.30, vomiting bright blood. Seen at 6, still vomiting. Under ether, stitched faucial pillars, plugged nasopharynx, and injected $\frac{1}{6}$ gr. of morphia. At 10 o'clock child better, conscious, talking, and asking for food. At 3 A.M. sudden death. Total bleeding following the operation not excessive. No post-mortem. Certificate signed "pulmonary embolism."

CASE 2. Girl, aged 6. Enlarged tonsils and adenoids. Operation at 10.30. Anæsthetic, C_1E_2 . Seen 12.30, hæmorrhage, vomiting. 1 P.M., second anæsthetic given. Clot in the left tonsillar fossa; left tonsillar pillars stitched; nasopharynx plugged. Patient did not recover consciousness, sudden death at 5 P.M. There had been no further bleeding. On post-mortem examination the tissues were blanched but not excessively. No clot in stomach. Thymus very slightly enlarged. A few enlarged mesenteric glands. Other organs normal. Verdict returned; death from hæmorrhage and shock.

The opinion of the members of the Section was desired on the following points: Was death caused by the anæsthetic, by embolism, or by laryngeal spasm? What part did the hæmorrhage play? In the discussion very little light was thrown on these points.

Large Angelioma of the Nasal Septum—Mr HERBERT TILLEY, F.R.C.S.—Female, aged 42, with large fungating, foul-smelling mass projecting from right nostril, and semi-fluctuating swelling over right side of nose. Growth was found to be attached to septal cartilage by pedicle, the size of an ordinary lead pencil, with extension upwards and backwards to ethmoidal region.

Pathologists were in doubt as to whether the growth was an angioma or melanotic sarcoma, but rather favoured the first named.

Tumour of the Larynx—a Soft Fibroma—Dr W. H. JEWELL, O.B.E.—Male, aged 57. Husky six months; five months

Societies' Proceedings

ago coughed up piece of "flesh," size of hazel-nut, giving relief for three weeks, but since then huskiness. Cough and impairment of breathing have been progressive. On tilting the head backwards, a smooth, succulent, and somewhat globular tumour nearly the size of half a walnut is seen passing backwards from beneath the epiglottis and covering the whole of the glottis with the exception of a narrow space at the posterior extremity of the vocal cords.

Foreign Body (Centipede) discharged from the Nose—

Mr CYRIL HORSFORD, F.R.C.S. — Patient suffers from chronic suppuration of the maxillary antrum, and has been twice operated upon. There is a good intranasal opening through which the antrum is regularly washed out, but discharge still continues. Following a few days' pain and irritation, the foreign body now shown, which looks like a caterpillar, was blown out alive (*Lithobius melanops*). Seventeen cases have been reported in which such animals have been found in nasal cavities.

Bilateral Adductor Paralysis—Mr PHILIP FRANKLIN, F.R.C.S.

—Male, aged 65, complains of hoarse voice, occasional paroxysms of coughing while eating or drinking. First noticed five years ago. No other symptom; negative Wassermann. Report of post-nasal swab: *Staphylococcus aureus* and *Micrococcus catarrhalis*. Both vocal cords are bowed on expiration, with approximation of vocal processes and arytaenoids. He suggested that a nasopharyngeal infection might probably be the cause.

A Laryngeal Growth (?) with Abductor Paralysis—

ELEANOR LOWRY, M.B.—Patient, a woman, aged 44, with hoarseness. loss of weight, and occasional choking attacks at night during the last twelve months. Weight, 6 st. 11 oz. Considerable pulmonary tuberculosis, both lungs. No tubercle bacilli. Thickening and granulations on right vocal process extending over posterior third of cord. Double abductor paresis.

SECTION OF OTOTOLOGY

January 21, 1921.

*President—*Sir CHARLES BALLANCE.

Cavernous Sinus Thrombosis—Mr T. RITCHIE RODGER.—

Published in *Journal of Laryngology*, April 1921.

Tympanic Exostoses—Mr W. M. MOLLISON.—

Girl, aged 20, had suffered from otorrhœa. Examination showed exostoses springing from the tympanic ring, and on one side almost touching the short process of the malleus. There was a second exostosis actually in the drumhead.

Royal Society of Medicine

Tinnitus associated with a Rhinolith—Mr LIONEL COLLEDGE.

—A woman, aged 59, complained of tinnitus, also of discharge from the right nostril and obstruction. No deafness. Right ear normal. Suppuration in the right maxillary antrum and polypi. With a probe the stone could be felt. A radical Caldwell-Luc operation was performed and the stone removed from the nasal fossa. A carious bicuspid tooth was also extracted. Symptoms greatly relieved.

Pyorrhœa Alveolaris affecting the Ears—Mr ARTHUR J. HUTCHISON.—CASE I. Female, aged 18. Increasing deafness and tinnitus in both ears. Membranes normal. Rinne positive; bone conduction shortened. Pyorrhœa alveolaris discovered; five teeth extracted. Tinnitus ceased and hearing improved.

CASE II. Male, October 1919, discharge from right ear; treated by antiseptic drops, syringing, vaccines, ionisation. In 1920 pain in right elbow, later in knee and neck. October 1920, pyorrhœa discovered; teeth extracted; within two weeks ear became perfectly dry; pains in joints disappeared.

Gunshot Wound of the Ear—Mr HAROLD A. KISCH.—Private J., admitted January 1916, suffering from extreme rheumatoid arthritis. He was morose. Profuse offensive discharge from left ear, with mastoid tenderness. At operation the base of a bullet could be seen just below the promontory. With some difficulty a complete rifle bullet was extracted, the point of which must have been in close relation with the carotid artery. No sign of fracture of the external meatus. Next morning he said: "There, I always told them it was there, but no one would believe me." His mentality immediately changed for the better. He stated that he was in a wood near Ypres, in October 1914, when he felt a "clack" in his ear. He fell down and then went back with his comrades. As there was some bleeding from the ear he was X-rayed, but nothing was seen. His ear started to discharge and his joints commenced to be affected. Uninterrupted recovery: joints also improved.

Foreign Body in Mastoid Antrum—Mr JEFFERSON FAULDER.—Boy, aged 8, admitted with a foreign body (blue bead) in the left ear. Healed scar in the post-aural groove. Attempts to extract the bead (*a*) *per vias naturales* failed; (*b*) post-aural incision. The foreign body was found to have disappeared. No normal structures could be made out in the tympanum. Two days later post-aural wound reopened. Depression found on the surface of the mastoid process, rather below the level of the spine. This was deepened until the antrum was opened, exposing the bead lying amongst granulations. It appeared to have arrived there by way of a much enlarged aditus. The radical mastoid operation was completed.

ABSTRACTS

NOSE AND ACCESSORY SINUSES

Cysts of the Floor of the Nose. GIGNOUX. (*Revue de Laryngologie*, February 1921.)

Gignoux reports three cases of cysts of the floor of the nose, there being a cyst on each side in one case. In reviewing the literature, he finds the first reference to these cysts in Zuckerkandl's *Anatomy of the Nasal Fossæ*, 1882. They are quite distinct from cysts of dental origin. One point of difference is that the fluid which fills them contains no cholesterine. Their site of origin is in front of the anterior end of the inferior turbinal, near to the junction of the skin and mucous membrane of the vestibule. As they increase in size, they push forward into the angle between the ala and the upper lip, and backward along the floor of the nose, under the mucous membrane. The histology of the lining membrane is variously reported on by different observers. In Gignoux's cases two or more layers of stratified epithelium were found, as was also the case in those of Brown-Kelly and Beck. Brüggemann and Kofler found cylindrical epithelium showing traces of ciliation. Others have found chalice cells.

The origin of these cysts is much disputed. Dunn and Brown-Kelly have demonstrated the presence of numerous mucous glands in the region in question. These glands, situated at the junction of the skin and mucous membrane, have very long excretory ducts, which are occasionally found to be dilated. On the other hand the restriction of the cysts to one narrow site of origin and their occasional occurrence on both sides, developing simultaneously, as in Gignoux's case, rather point to a developmental origin. This view is also supported to some extent by the histological findings. Neither a lining membrane, consisting of several layers of stratified epithelium, nor one of cylindrical ciliated epithelium would agree very well with the retention cyst theory. The difficulty with the developmental theory is to choose between the numerous anatomical structures which have been suggested as parents of the cysts. These include:—the nasopalatine canal of Stenson (Wyatt-Wingrave, Grünwald); Jacobsen's organ (Wyatt-Wingrave); the Maxillo-Intermaxillary fissure (Klestadt); the "Glandula nasalis lateralis" of Stenson (Grosser); and the terminal portion of the nasal duct (Brüggemann). Of these structures the nasopalatine canal and Jacobsen's organ appear to be too central to correspond with the localisation of the cysts. Between the claims of the remaining three Gignoux does not attempt to decide.

G. WILKINSON.

Sarcoma of the Nasal Vestibule. GEORGE D. WOLF. (*Medical Record*, 29th January 1921.)

Compared with new growths in other situations, tumours of the nose have attracted little attention, and many cases of malignant

Larynx

disease are overlooked from want of pathological investigation. All specimens removed from the nose should be submitted to the pathologist, especially if epistaxis has been a feature of the case. The thorough eradication of benign growths is imperative, though it is not yet proved whether such growths undergo malignant degeneration. Finally, it is important to investigate all malignant growths of the cervical glands, so as to ascertain what proportion, if any, have their origin in the nasal chambers.

DOUGLAS GUTHRIE.

Post-operative Obliteration of the Nasal Sinuses. P. CALICETI.
(*Arch. Ital. di Otol.*, xxxi., No. 4, 1920.)

Caliceti gives results of some experimental work on the frontal sinuses in dogs. There were two series of experiments. In the first group of five animals a tiny opening was made through the anterior wall of the frontal sinus on one side and a culture of live staphylococci was injected into the cavity. The infection was kept active for three months. After this period the sinus was opened through the anterior wall, the mucous membrane was removed, the cavity curetted, and painted with iodine. The wound was then closed. The other side was left untouched as a control. In the second group of three animals the same operation was carried out on healthy sinuses. The animals were killed at periods of from one to seven months later and examined.

In the first group of cases the operated sinus was in no instance obliterated. The cavity was found to be partly filled by new fibrous tissue and some spongy bone. Microscopic examination showed that the periosteum was considerably thickened and had proliferated into the cavity. In most of the cases the anterior wound in the bone had become closed by new bone formation within three months. In one case a cavity was found containing muco-pus and lined by granulations. Here some mucous membrane had been left accidentally. In the second group with healthy sinuses one case still showed a small cavity, the other two were completely obliterated by formation of new spongy bone.

Caliceti concludes that the septic process had exerted an inhibitory effect on the new bone formation.

J. K. MILNE DICKIE.

LARYNX

Laryngeal Function in Thyroid Cases. EDWARD STARR JUDD.
(*Annals of Surgery*, March 1921.)

All the intrinsic muscles of the larynx are supplied by the recurrent laryngeal nerve which lies in a groove between the trachea and the œsophagus. It is intimately associated with the capsule of the thyroid gland, and lies between the latter and the tracheal and cricoid cartilages. Apart from toxæmia it is, therefore, exposed to pressure by the gland.

Abstracts

The resulting paralysis is by no means proportional to the thyroid enlargement, and in a few cases occurs on the opposite side to the enlargement. This fact, coupled with the existence of paralysis of one cord in patients with no thyroid enlargement, emphasises the importance of pre-operative laryngeal examinations in all thyroid cases. The degree of functional disturbance is determined by the rapidity of onset. If this be gradual, a simultaneously developed over-action of the healthy cord eliminates all functional disturbance. Total loss of the voice with enlargement of the thyroid is almost certainly due to either hysteria or carcinoma, and to the latter if no movement at all of the cords is discernible by the laryngoscope. In malignant disease we are concerned not with pressure phenomena but with actual invasion and destruction of the nerve.

As Guthrie has pointed out, temporary disturbance of the vocal and respiratory functions of the larynx frequently follows thyroidectomy, and may be due to backward displacement of the larynx, to a true myositis of the laryngeal muscles, or to trauma of the laryngeal nerve.

Experiments were carried out on a large number of dogs; the recurrent laryngeal nerve being injured by pinching, ligation, and stretching. By the first method movement of the cord returned in from thirty to sixty days, according to the distance of the trauma from the larynx. Ligation invariably caused complete and permanent paralysis. Stretching of the nerve did not always cause paralysis.

In only nine cases out of 25,000 thyroidectomies has the post-operative functional disturbance of the larynx been permanent. In these the disturbance was almost entirely confined to the respiratory function of the larynx; the voice being unaffected. These patients had a bilateral abductor paralysis of gradual onset, dyspnoea appearing four to eight weeks after operation and gradually increasing. A similar condition, not uncommon in syphilitic and tabetic conditions, is occasionally observed apart from any thyroid abnormality, and has been attributed to toxic influences. In the author's cases the paralysis was confined to the posticus muscle, and there was no ankylosis of the joints. The possibility of a myositis of the posticus muscle remains, and the cases in which the condition arose were for the most part those in which the adenomas were retro-tracheal or retro-laryngeal in position. The author is unable to offer an explanation of the condition; no method of injuring either the superior or inferior laryngeal nerve in dogs produces the condition.

The Recurrent Laryngeal is a pure motor nerve from the vagus. It can be separated into two bundles, one, with much the larger number of terminations, to the adductors, and the other to the abductors. The inequality in the number of muscle endings may be an explanation of the greater vulnerability of the abductor bundle.

Larynx .

The late and gradual onset of this condition suggests scar contraction around the nerve, but it is difficult to see how this can be symmetrical in action, especially in cases in which the operative manipulation has been confined entirely to the one side. A toxic factor is possible, but in the majority of cases the goitre was non-toxic, so that the toxæmia of hyper-thyroidism is eliminated. In several of the cases the margin of safety for respiration was so narrow that tracheotomy was necessary.

GILBERT CHUBB.

Laryngofissure for Carcinoma. NORVAL H. PIERCE, M.D. (*Annals of Otology*, September 1920.)

Laryngofissure should occupy a more prominent position among laryngologists in the surgery of the larynx than it does. The assumption of its proper position has been delayed by the advent of direct laryngoscopy.

Except in a very few exceptional cases, specimens for microscopical examination of suspected cases of carcinoma of the larynx should not be obtained by indirect laryngoscopy. The only method that competes with laryngofissure for securing diagnostic specimens is direct or suspension laryngoscopy. But this method should not be used for removal of the mass, except in the rarest cases where the growth is small and superficial.

The author makes a plea for laryngofissure as the procedure of preference in the surgical treatment of early cases of carcinoma of the lateral walls of the larynx.

He has had unfortunate experiences in cases where the tracheotomy has been done at the time of operation. Practically all his deaths have occurred in patients who have had a tracheotomy performed at the time of operation.

Now, the whole procedure is performed under local anæsthesia. The whole aspect of the operation has changed. There is no longer danger of blood getting down into the trachea or bronchi during the operation. The tracheal reflexes expel anything that goes down. In cases where the tumour is small, a preliminary tracheotomy should not be performed. All the cases the author operated on without a tube, where the larynx has been closed immediately, have recovered. We should use a tracheotomy tube only in cases where the denuded area is going to be large, in cases where we are going to remove part of the interarytenoid region, and in cases where we use radium.

Should the tracheotomy tube be placed in the trachea at the time of operation? The author believes not. The tube should be introduced at least eight days before the larynx is opened.

As regards opening the thyroid cartilage there is very little to be said. The author thinks that it is not always necessary to divide laterally the thyro-hyoid membrane.

Abstracts

It is not necessary to pack the larynx after laryngo-fissure for carcinoma. In the old days, when we used general anæsthesia, the bleeding was very much greater and vomiting was to be feared, especially during the time the patient was unconscious. The patient being conscious, he can expel the secretion at any time, and we do not need to pack for hæmorrhage.

The author advises immediate closure of the larynx. He believes we should do so even in cases where the actual cautery is used, because he has observed cases in which the swelling, after considerable cauterisation of the larynx, was insignificant.

If radium is used then we must leave the larynx open. Deglutition is very much more painful and difficult in cases where the larynx remains open. It is not necessary to put stitches through the cartilage. As a rule the larynx closes very kindly. The best way of preventing infection is to close the larynx immediately. ARCHER RYLAND.

Radiological Observations on the Ossification of the Anterior Margin of the Thyroid Cartilage and the Cricoid Cartilage. G. CERESOLE. (*Arch. Ital. di Otol.*, xxxi., No. 2, 1920.)

The importance of this subject was brought home to the author by a case which had been diagnosed as a foreign body in the larynx through faulty interpretation of a radiogram. The foreign body in question was merely the partially ossified margin of the thyroid cartilage. As a result of this a series of investigations were carried out with the object of determining the age at which ossification takes place. In all, 3708 people were examined, whose ages varied from twenty to fifty-two years. The earliest instance of ossification of the anterior edge of the thyroid was at twenty-three years, and of the cricoid at thirty-five. The ossification of the thyroid begins on its anterior border either at the top or the bottom and spreads from there upwards or downwards. In the cricoid it commences as an oval area of opacity on the front part of the cartilage. The thyroid was found to be partially ossified in 100 per cent. of patients at forty-one, and the cricoid in 100 per cent. at fifty years of age. It was found that nearly all of the cases in which ossification commenced unusually early were subjects of some chronic disease, of which the most common were tuberculosis (non-laryngeal), syphilis, or arthritis.

J. K. MILNE DICKIE.

Cellulitis of the Para-Pharyngeal Tissues causing Laryngeal Œdema. CORNELIUS GODFREY COAKLEY. (*The Laryngoscope*, 1920, Vol. xxx., p. 65.)

Œdema of the ary-epiglottic folds and epiglottis is frequently seen accompanying the severer types of inflammation of the pharyngeal

Larynx

mucous membrane. Retro-pharyngeal abscesses, on the other hand, seldom cause such a degree of laryngeal œdema as to cause the surgeon much concern. A laryngeal œdema of moderate degree, usually unilateral, may be seen in quite a large proportion of cases of peritonsillar abscess. The laryngeal œdema is seen especially in cases in which there is a marked infiltration of the anterior or posterior pillars. If there be any spread of the infection along the lymphatics on the lateral wall of the neck, producing a cellulitis, or abscess under the deep fascia, an external operation is called for. Laryngeal œdema usually accompanies these cases. Coakley records a case of peritonsillar abscess on the right side. The abscess was opened, but only a drop or two of pus was found. Coakley found a hematoma in the peritonsillar tissues, and œdema of the ary-epiglottic folds. An induration appeared at the side of the neck below the angle of the jaw. *Operation* by general surgeon: novocain infiltration, incision parallel to and three-fourths of an inch below the inferior maxilla. After reaching the deep fascia a pair of long curved artery forceps was pushed in, but without finding any pus. The surgeon put one finger in the patient's mouth, down to the pyriform fossa, and directing the forceps through the wound towards this finger, at once evacuated a dram of foul discharge. Within twenty-four hours there was a marked subsidence of the œdema.

Abscesses in the pyriform and in the glosso-epiglottic fossæ are accompanied by considerable laryngeal œdema. Direct inspection may show a yellow area indicating the formation of pus. The pus should then be evacuated with a straight knife. It is poor technique to stab the œdematous tissue in the hope of relieving the symptoms. Coakley knows of two cases where within one hour after this procedure the patient had a severe hæmorrhage and died.

Extensive laryngeal œdema may accompany malignant disease of the hypo-pharynx. By examining the hypo-pharynx by the direct method the source of the œdema is readily discovered.

Coakley holds that in cases of Ludwig's angina there is usually a history of a sore throat, often an acute tonsillitis. Cases may be divided in two classes—(1) the erysipelatous type, which runs its course without any localised abscess formation; (2) abscess formation, either large or small, appears. Coakley records two cases associated with tonsillitis in which emergency tracheotomy was performed. Both patients, however, had apparently died before operation and artificial respiration was without avail. Coakley advocates external incision. Tracheotomy, even if done in time, does not give very brilliant results, as the infected material from the pharynx passes through the larynx around the tracheotomy tube into the lungs, producing a septic pneumonia, which is invariably fatal. In the second class there is

Abstracts

a definite pus collection in the region of the sub-maxillary or sub-lingual glands, or beneath the tongue anteriorly. There is an upward and backward displacement of the tongue. Most of these infections come from the floor of the mouth or from carious teeth. External incision into the abscess results in recovery. J. S. FRASER.

PERORAL ENDOSCOPY.

A Case of Gunshot Wound in which the Bullet was removed by means of the Œsophagoscope. G. N. BIGGS. (*Lancet*, 1921, Vol. i., p. 589.)

The bullet entered the right side of the face, passed through the right antrum, fractured the septum, penetrated the hard palate, missed the soft palate, entered the posterior pharyngeal wall an inch above the cricoid, and embedded itself in the muscles $1\frac{1}{2}$ inches below the cricoid exactly in the middle line.

As it lay in an abscess cavity, the author preferred to use the osophagoscope rather than risk a deep dissection. By this means the sinus in the pharynx was enlarged, and, after a tedious operation, the bullet was removed. It slipped from the forceps, was swallowed, and passed, four days later, *per rectum*. The patient made an uninterrupted recovery. MACLEOD YEARSLEY.

Case of Œsophageal Obstruction in a Girl aged Four and a half Years.

REGINALD C. JEWESBURY. (*Proc. R. S. M.*, Section for Study of Disease in Children, p. 22, March 1921.)

Child unable to swallow solids from birth but has had no difficulty with liquids.

X-ray with bismuth meal shows a large shadow at the lower end of the œsophagus. Œsophagoscopy showed a small circular opening about $\frac{1}{8}$ of an inch at site of obstruction.

This was dilated with bougies with benefit, and treatment is being continued by passage of mercury tubes. G. B. BRAND.

Foreign Body (Coin) in the Trachea. GAVEL and GIGNOUX. (*Soc. des Sc. Méd. de Lyon*, 13th April 1920.)

The coin, a 50-centime piece, had been in the trachea for three months. By radiography it was seen just above the bifurcation. After a futile attempt at removal by upper bronchoscopy, tracheotomy was performed and the coin was easily extracted, and the wound sutured. The secretion of mucopus, which had been copious, ceased within ten days. DOUGLAS GUTHRIE.

Miscellaneous

Cicatricial Web Stenosis of the Larynx and Trachea. HENRY LOWNDES
LYNAH. (*The Laryngoscope*, 1920, Vol. xxx., p. 343.)

The author states that web stenosis is one of the most frequent causes of inability to permanently detubate and decannulate patients after diphtheria. Further, cicatricial webs frequently follow injuries to the larynx, endoscopic operations for laryngeal papilloma, and plastic operations on the larynx and trachea. The web may (1) involve the ventricular bands (after laryngo-fissure); (2) the vocal cords (papilloma cases); (3) the subglottic region (post-diphtheritic cases); or (4) the trachea (tracheal fistula cases). In some of the cases the halves of the larynx are apparently fused together, and, on the introduction of a small bougie, the cords can be gently separated and a small dark spot seen just below the cords—the imperforate subglottic cicatrix. As soon as the web is severed (in some instances with a small bougie) the patient utters a loud cry.

The treatment of cicatricial web stenosis is by endolaryngeal and retrograde bouginage, and by repeated applications of the galvano-cautery. If the stenosis is thick and imperforate, it may be severed with the knife, the cutting edge being turned in the anterior direction. If the web is thin and imperforate, gentle pressure with a small bougie will open it. As soon as the web is incised by the laryngeal knife or galvano-cautery, a small intubation tube or soft rubber laryngeal tube should be introduced to keep the edges from fusing. This is only necessary, however, when one is dealing with an imperforate web stenosis. The lumen has no tendency to close once bouginage has been started. Bouginage and galvano-cauterisation are performed once a week.

The same method of treatment has been employed in the treatment of tracheal stenosis. Six cases are reported.

J. S. FRASER.

MISCELLANEOUS

A Refinement in the Radical Operation for Trigeminal Neuralgia.

CHARLES H. FRAZIER, M.D., Philadelphia, Penn., U.S.A.
(*Journ. Amer. Med. Assoc.*, Vol. lxxv., No. 2, 8th January 1921.)

In 1895 the mortality as recorded in Tiffany's tables was 22.5 per cent., while in 1909, in a series of 200 cases which the author collected from four surgeons of large experience, the death rate was only 3.5 per cent. In Frazier's last 157 cases, only one death occurred, and that in a patient who succumbed to apoplexy during the convalescent stage. The operation may therefore be considered almost free from risk, and complete relief from pain may be expected

Abstracts

when the sensory root operation is carried out rather than excision of the Gasserian ganglion.

In the past the motor root was often sacrificed because the surgeon was afraid he might be leaving a fasciculus of the sensory root with all its unfortunate possibilities. It was suggested to Frazier by Dr C. C. Coleman, that an electrode might be of assistance in the identification of the motor root. By preserving this root, symmetry of the face is conserved, as there is no atrophy of the temporal muscle: there is no deviation of the jaw, as the pterygoid muscles are intact and there is no interference with mastication.

PERRY GOLDSMITH.

The Rôle of Deep Alcohol Injections in the Treatment of Trigeminal Neuralgia. HARVEY CUSHING. (*Journ. Amer. Med. Assoc.*, 14th August 1920.)

The author discusses the advantages and disadvantages of deep alcohol injections. He points out that injections of the trunks of the trigeminal nerve are not without danger. He has seen numerous cases where very undesirable results had followed, such as oculomotor paralysis, locking of the jaw from infiltration and subsequent fibrosis of the pterygoid muscles, paralysis of the motor branch of the fifth, facial paralysis, and, worst of all, labyrinthine symptoms from accidental injection into the middle ear. The Eustachian tube is only a few millimetres from the trunk of the mandibular nerve, and hence it is easy to strike it by accident. He deplores the intranasal injection of Meckel's ganglion, since he has seen sloughing of the nasal bones in consequence. He is of opinion that the intranasal method is more dangerous than the extranasal method, which is fairly satisfactory. Injection of the Gasserian ganglion itself should never be attempted, as it is impossible to limit the injection, and spreading may occur to neighbouring structures in the posterior fossa. He himself had one case in which the injection accidentally ran up the sheath of the nerve and produced complete paralysis of the whole trigeminal. So much for the bad effects of alcohol injections. In favour of alcohol injections it is to be noted that a successful injection of the nerve trunk gives complete relief for a period of nine months on the average. He concludes that alcohol injections are the method of choice in all cases where the symptoms are limited to one or two divisions. Where three divisions are involved avulsion of the sensory root is recommended. "With such perfect and permanent results as may be secured to-day by a trigeminal sensory root avulsion, the prolonged and repeated use of injections in refractory cases which involve more than one division should be deplored."

J. K. MILNE DICKIE.

Miscellaneous

Paralysis of Five Cranial Nerves, due to Aneurysmal Dilatation of the Sigmoid Sinus and Jugular Bulb. MOLINIÉ, Marseilles. (*Revue de Laryngologie*, February 1921.)

The following is a brief summary of this remarkable case. Patient, a peasant woman of 64. Discharge from the left ear since childhood. Polypus removed when 30 years of age: much hæmorrhage. Seen by reporter in 1898, who noted fœtid discharge, granulations and cholesteatoma in left ear. Operation. Exposure of tympanum and antrum. Curettage of these cavities started a free hæmorrhage, which prevented the operation being completed. Hæmorrhage stopped by packing. Radical operation again attempted in 1905, but had again to be abandoned on account of bleeding. A year later complete paralysis of the 7th nerve supervened. The patient was kept under observation during the next fifteen years. The auricular cavity gradually filled up with a soft elastic reddish swelling, which eventually came to protrude both at the meatus and through the retroauricular wound. The tumour did not pulsate visibly, but on compressing the sac with the finger, pulsation could be felt, and the pulsations could be seen as the cavity refilled. In July 1920, a sudden hæmorrhage took place. Shortly after a widespread paralysis of cranial nerves appeared, causing dysphagia, sensation of foreign body in the throat, alteration of the voice and difficulty in raising the left arm and shoulder.

Examination showed complete paralysis of the 7th and 8th nerves; paralysis of the left side of pharynx and loss of taste on the left side of the base of the tongue (9th nerve); complete paralysis of the left side of the palate and left vocal cord (inner division of 11th) and paralysis of sterno-mastoid (partial) and trapezius (total) external branch of 11th. Disturbance of the pneumogastric proper was inferred from the presence of palpitation and attacks of coughing. Thus the 7th, 8th, 9th, 10th, and 11th cranial nerves were paralysed; the 12th was not affected.

Molinié has only been able to find record of one other case of aneurysm of the lateral sinus, that recorded by Collet, Lamoin, and Patel, of a soldier whose sinus was wounded by a piece of shrapnel. The case was operated upon successfully, the jugular being tied in the neck and the sinus obliterated by pressure above the aneurysm. In the case here recorded operation was refused.

In summing up, the writer suggests that the paralysis of the 7th and 8th nerves was due to the erosion of the antrum and tympanum by cholesteatoma. The paralysis of the 9th, 10th, and 11th appeared suddenly and simultaneously many years later and was evidently due to pressure by the aneurysm on the nerve trunks within the jugular foramen. He disclaims any wish to add to the list of "Syndromes," which he thinks is already too long, and suggests that in future

Abstracts

paralysis of groups of cranial nerves should be classified entirely according to the nerves involved and not according to the symptoms.

G. WILKINSON.

Stigmata of Predisposition to Bone and Joint Tubercle. W. C. RIVERS.
(*British Journal of Children's Diseases*, Nos. 200-204, Vol. xvii.,
July-December 1920.)

The abstractor's remarks are confined to that part of River's very interesting article, which has a laryngological interest. The author complains that the subject has not been sufficiently appreciated by laryngologists as a body in its relationship to their work, but he readily acknowledges the valuable contributions to this subject made by such a noted laryngologist as Moure of Bordeaux.

The deductions arrived at are the outcome of special examination of a large number of cases of surgical tuberculosis and their comparison with other or control cases not so afflicted.

The two great nasal affections associated with surgical tuberculosis are ozæna and catarrhal rhinitis. The latter-day view of the majority of observers is that atrophic rhinitis is the cause of the tuberculosis found along with it.

The association of catarrhal rhinitis with scrofulosis is so familiar that it is often overlooked and undescribed as a symptom of the latter condition. The affection is dependent upon simple micro-organisms and is analogous to the other septic infections common in surgical tuberculosis. Moure has attempted to combine the ozænic and catarrhal condition under the title of *coryza pseudo-atrophique*, a non-tubercular hereditary affection peculiar to strumous subjects. This tallies with Bosworth's hypothesis that ozæna takes its origin from the chronic purulent rhinitis of childhood.

In the cases from which the author's statistics are taken, endonasal atrophy short of ozæna was commoner in the definitely tuberculous children. In all cases the affection was more than twice as common in females. Nasal obstruction was markedly predominant in the tuberculous children. In this case the male sex predominated, a fact which the author attributes to the relative frequency of the leptorrhinic conformation in this sex. Non-tuberculous abnormalities, neither atrophic nor obstructive, occurred with marked preponderance in the tuberculous children.

The author's statistics, derived from a conclusively large number of cases, show that in bone and joint tubercle non-tuberculous nasal abnormality is more than three times as common as in the general population. From the practical standpoint it is most important to remember that a thin whitish-yellow crusting in the nasal fossæ, especially on the septum, was ten times more frequently present in the tuberculous children than in the controls.

Reviews of Books

The respiratory impairment which results either from absence of the normal Schneiderian secretion or from obstruction, predisposes the individual to infection as a result of which external noxæ find it easier to gain an entry either by the respiratory, the lympho-hæmic or the alimentary systems.

Amongst his other conclusions the author gives it as his opinion that the noting of the stigmata of tuberculous predisposition should form part of the routine work of school medical inspection. The only special training needed would be in rhinology.

JAMES B. HORGAN.

REVIEWS OF BOOKS

Medical Treatment in Oto-Rhino-Laryngology: Précis de Thérapeutique Médicale Oto Rhino Laryngologique. Dr G. DE PARREL, Instit. Nat. des Sourds-Muets de Paris, &c., pp. 671+x. A. Maloine et Fils: Paris, 1921.

In this volume of nearly 700 pages, the author deals very completely with his subject, non-surgical treatment. In the half of the book devoted to drug treatment, a short note on ætiology and pathology and sometimes on diagnosis, precedes the account of therapeutic measures. A mass of information is offered on the subject of treatment by drugs and vaccines. Prescriptions are fully set out and the methods of application carefully enunciated. In each case, general, dietetic, and hygienic measures are given. The subject of vaccine treatment is separately considered in a special chapter. Although surgical procedures are considered entirely outside the scope of this work—except myringotomy and ossiculectomy, which are described—pre- and post-operative measures and complications are fully dealt with. In this connection one cannot entirely agree with the wisdom of mopping the nasopharynx with peroxide of hydrogen immediately after curetting adenoids.

The remainder of the book is devoted to physical measures. Electrotherapy, including cauterisation and ionisation, radiotherapy, climatology, and balneology are considered in turn. The treatment of deaf-mutism, voice production, and lip reading receive special attention. Indeed, this part of the book is the most interesting and the most valuable. References are facilitated by a very complete index, a small pharmacopœia, and a table of authors.

It is unfortunate that the author's ambition to render his book complete has carried him beyond this. The work can obviously appeal to few outside the specialty, and the specialist is not in need of much of the information. More than a tenth of the book is devoted to a pharmacology; and such matter as the theory of anaphylaxis, of

Reviews of Books

nitritoid crises in arsenic injection, or of sensitised vaccines, cannot be dealt with at sufficient length to be clear except to those already masters of them. These, and a perhaps unnecessary compendium of French Mineral Spas, add much to the volume but little to the value of the work.

E. WATSON WILLIAMS.

Manual of Ophthalmic Practice—Manual of Ophthalmic Operations (2nd Edition). F. P. MAYNARD, M.B., D.P.H., F.R.C.S., Lieut.-Colonel I.M.S. (Retired). E. & S. Livingstone: Edinburgh.

The ideal text-book of Ophthalmology may be compared to a synthetic compound of three refulgent elements in stable combination. Its essentials are a full initiation into the methods of examining the eye and its functions, a vivid clinical delineation of living pathology, and an embodiment of those methods of treatment which yield uniformly good results. In other words, it should impart an appreciation of principles, not merely a knowledge of facts.

At the present time few men are better qualified than Colonel Maynard for the task which he has undertaken, and it is precisely in the above qualities that his two volumes excel. Having spoken thus highly of them, we shall feel at liberty, in the course of our remarks, to criticise anything from which we dissent.

The *Manual of Ophthalmic Practice* is well printed, and its general arrangement is all that could be desired. There are numerous coloured plates, some of which depict advanced stages of disease encountered in tropical countries. Two convincing photographs, showing that a child feels more secure when looking over the nurse's shoulder than when both patient and nurse are facing the surgeon, are particularly noteworthy.

There is much that will appeal to the rhinologist and otologist, for the ophthalmic complications of morbid conditions within their respective provinces are dealt with luminously, if not exhaustively.

In connection with certain of the rarer diseases of the eye which are little amenable to treatment, but yet form a constant proportion of ophthalmic practice, we find ourselves, here and there, wishing that the author had been eclectic, albeit the manual is written for students and general practitioners.

Colonel Maynard expressly points out, however, the abyss between low visual acuity and none at all. He is full of sympathy for the sightless, and reminds his Bengali students of their definition of the Blind Man—Suradas, "the Servant of God."

In the *Manual of Ophthalmic Operations*, the author describes judiciously selected operations, omitting nothing calculated to further their success. The preparation of the patient, the operative technique, and after-treatment, are ably dealt with; and the management of possible complications is carefully considered. In consequence, the

General Notes

range of alternative procedures, particularly in respect of certain methods introduced by American Operators, is somewhat limited.

For senile cataract the author advocates an extraction with iridectomy conducted on orthodox lines. He inclines to the pardonable heresy that the practical advantages of reversible and ivory-handled instruments outweigh the theoretical virtues of those which are single and constructed entirely of metal. He suggests the following method of co-ordinating the movements concerned in the corneal section. Having made the counter puncture, further axial progress of the knife is accompanied by upward movement of the point, whilst withdrawal is associated with upward movement of the hilt. Thus the surgeon's attention is not divided between the two extremities of the incision, and the alternate depression and elevation of the handle instinctively combined with sawing movements, instead of being voluntarily suppressed, is preserved as a simple, continuous, and elegant *tour-de-maitre*.

That English is gradually becoming the universal language of medical science is due in no small degree to the labours of the Indian School of Ophthalmic Surgeons. Colonel Maynard has enriched ophthalmic literature with a treatise to which the words *Δύχρον ὄζει*—"it smells of the lamp"—said of the work of Demosthenes, will never be applied.

SAMUEL LODGE.

WM. OLIVER LODGE.

GENERAL NOTES

THE SEMI-JUBILEE OF "THE LARYNGOSCOPE."

We desire to take the present opportunity of congratulating Dr Max A. Goldstein, the esteemed Editor of our contemporary, *The Laryngoscope*, upon the attainment of its semi-jubilee. The Journal now celebrates the twenty-fifth anniversary of its uninterrupted monthly publication. The first issue appeared in St Louis in July, 1896, with Frank M. Rumbold and Max A. Goldstein as conjoint editors. In 1898, a European Editor was added in the person of Sir St Clair Thomson, who continued for some years to hold the position. Notwithstanding the various changes which it has been deemed necessary to make in the personnel of the Staff and in the conduct of the Journal, Dr Goldstein's position as Editor has remained unchanged since its inception. He is still at the helm, and he has been mainly responsible for placing the Journal in the accredited position which it now occupies amongst contemporary Medical Periodicals, not only in the United States but beyond its borders. We express the hope that he may continue to guide and control the fortunes of *The Laryngoscope* for a further period of time in the same successful manner as he has done in the earlier years of its history.

General Notes

A SURGICAL ACCIDENT: NASAL PLUGS IN TRACHEA.

From *The British Journal of Surgery*, April 1920.

The following account of an unusual accident should be worth recording as a warning to others. I recently performed a submucous resection of the nasal septum on an adult male patient under ether anaesthesia, with a preliminary local application of cocaine and adrenalin. The operation was uneventful, and at its conclusion I put a plug in either side of the nose, to act as a splint and keep the flaps of mucous membrane in opposition. It has been my custom for some years to use, for this purpose, the finger of an ordinary rubber operating-glove filled with gauze. As the patient was being wheeled from the operating-theatre it was noticed that he was cyanosed and not breathing. His pulse was good. I started artificial respiration, but no air would enter the chest, and I then noticed that the plugs were missing from the nose. I did an immediate tracheotomy, but no air entered on artificial respiration. I then removed the plugs with Paterson's direct laryngeal forceps, through the tracheotomy wound; they were both impacted at the tracheal bifurcation. The patient recovered with artificial respiration, and had an uninterrupted convalescence.

Apparently the patient inhaled the two plugs by one sudden deep inspiration, which, in view of their size (a soft cylinder, one inch diameter by three inches long), was an extraordinary proceeding. The lesson seems to be that it is unsafe to leave a plug in the nose unless anchored externally.

* * *

ROYAL SOCIETY OF MEDICINE.

At a Special General Meeting of Fellows held in the Society's House on Monday, 20th June, at 5 P.M., the following resolutions were passed by a large majority:—

(1) That the By-laws be altered so as to provide that the "Proceedings" of the Society shall be published under the direction of the Council as regards arrangements for publication and the financial cost incurred, but this shall not interfere with the right of each Section to decide what shall appear as its own "Proceedings," subject only to the financial limitations imposed by the Council of the Society.

(2) That the By-laws be altered so as to provide that the copyright of papers accepted by the Society, or by any of the Sections, becomes thereby the property of the Society.

(3) That the By-laws be altered so as to provide that the subscriptions of all Fellows in the London Postal Area be £5, 5s. per annum, and that the subscriptions of all other Fellows in the United Kingdom be £4, 4s.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

OPERATIONS ON THE FRONTAL SINUS.*

By WALTER G. HOWARTH, M.A., M.B., F.R.C.S., Surgeon to the
Throat and Nose Department, St Thomas' Hospital, etc.

It is in some ways difficult for the individual surgeon to assess the relative value of the various operations that have been devised to attain a particular object. Tradition and the habit of following the dicta laid down by an eminent surgeon and his followers are in many ways apt to ensure the pursuit of a particular method until it becomes almost the recognised procedure.

Fortunately, as regards the frontal sinus, it is only comparatively recently that operative measures have been undertaken on any considerable scale for the alleviation or cure of the effects of chronic suppuration in that cavity, with the result that no one method has become the stereotyped routine. So much is this the case that only a few years ago controversy raged hotly over the respective merits of the external operation and the more recently introduced intranasal procedure. Sufficient time has now elapsed, and sufficient experience has been accumulated to enable us dispassionately to examine the chief operations that can be employed to deal with chronic suppuration in the frontal sinus, and to come to some understanding with regard to their various objects and relative merits.

An operation is to my mind what the surgeon makes it, and so I think that the experience of an individual is a

* Paper read at the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, 2nd June 1921.

Walter G. Howarth

more valuable criterion than that of a group, provided that the series of cases is large enough, since no two cases are alike, and operative procedure must always be adapted to the occasion and modified by experience.

For this reason I propose to approach the subject largely from the personal standpoint, in the hope of eliciting criticism and furthering the expression of individual experience.

The war and my association with St Dunstan's have enlarged my opportunities considerably, so that these cases added to my civilian ones bring the number with which I have had occasion to deal to more than two hundred: and it is on the experience derived from these that I propose mainly to base my remarks.

When a case of well-established chronic suppuration presents itself, and it is decided that operative measures are essential, one has to consider in the first instance the probable genesis of the condition, and to base one's procedure accordingly.

The conclusion that I have come to is, that none of these cases are simple ones, and that chronic suppuration in the frontal sinus is indissolubly bound up with suppuration in the ethmoid, so that I now regard the ethmoid as the key to the frontal sinus. This being so, my first endeavour is to clear out, by intranasal means, as much of the anterior ethmoidal labyrinth as is possible, with a view to establishing free drainage through the fronto-nasal duct.

If the anterior cells are adequately removed either by Mosher's procedure or any other, the bony passage into the frontal sinus is less than a centimetre in length, and it will usually be possible to pass a cannula or small style into it.

Even if this be feasible, and still more, if no entrance can be effected, the question of drainage is paramount and the possibility of intranasal enlargement of the duct comes before us and demands our consideration. This brings me to the intranasal operation.

We know that by means of various burrs and rasps we can enlarge the fronto-nasal duct so that it will admit the passage of a No. 15 bougie: this enlargement is usually effected by removing the spur of bone that projects backwards from the nasal process of the frontal bone and impinges on the anterior portion of the fronto-nasal duct and modifies its direction.

So far, so good; but is it possible to maintain this opening patent, even with the daily passage of bougies, long enough to ensure a permanent cure of the sinus suppuration. I believe

Operations on the Frontal Sinus

that in a considerable number of cases this can be effected, but that these are not the really long standing ones, and I think that one can say that the more nearly the case approaches to the acute stage, the more is the intranasal operation likely to be successful.

The advantages of the operation are that it is comparatively easily performed, and that it often affords striking relief to the immediate symptoms. The rasps devised by Dr Watson-Williams seem to me by far the best, and with their aid it should be possible to enlarge the opening sufficiently to admit the No. 15 bougie of his series.

The disadvantages are that the opening that one can make is not a very big one, and as it is achieved by rasping the bony wall of the duct, the raw surface of the bone naturally forms granulations which tend to become œdematous and to obstruct the passage. This can be obviated to some extent by the passing of bougies and the use of probes tipped with silver nitrate, but, in some cases, new bone is formed from the cut surface, and may result in a stenosis which is far more troublesome to deal with than the original obstruction. One sometimes wonders whether rasping the fronto-nasal duct is really an advantage, and whether as good a result would not be obtained by as thorough a removal of the ethmoidal cells as is possible and reliance on natural drainage. Many cases of chronic suppuration are not improved by the intranasal operation, and though the explanation of a loculated sinus or an inadequate opening may be advanced, I believe that outlying ethmoidal cells, orbito-ethmoidal, fronto-ethmoidal, or a group in front of the lachrymal bone are responsible. These cannot be dealt with by intranasal means, and they often tend to keep up suppuration in the frontal sinus.

It will be obvious that I am one of those who think that the pendulum has swung too far to the side of the purely intranasal operation, and so I will turn to the question of external operations.

There are two operations that are commonly used in this country, the Killian operation and the Ogston-Luc operation. As I employ neither of them it will be advisable to state the reasons for discarding them and to give those in favour of another procedure.

The Killian operation seems to me to be founded on a fallacy, namely, that it is possible completely to obliterate the

Walter G. Howarth

frontal sinus. By this statement I do not mean that it is never possible to obliterate the cavity, since one knows that in shallow sinuses it can even be effected by the Kuhnt operation; but Killian's operation seeks to do it every time and in every kind of sinus, and this I hold to be often impossible by that method.

Complicated sinuses are, anatomically speaking, common, and surgically still more so, and it is in these that the Killian operation is apt to leave "dead spaces" behind the bridge, along the ethmoid and elsewhere, which prevent satisfactory healing and may be a source of future danger. But even if one could attain the object by these means, why try to obliterate the cavity when one can drain it?

This brings me to the Ogston-Luc operation, a sounder proceeding, but to which I have two objections. One which it shares with the Killian operation is the opening of the anterior wall of the sinus and the consequent possibility of osteomyelitis: the other objection is that it fails to provide for really adequate treatment of the ethmoid and a sufficiently free opening into the nose.

I should now like to bring to your consideration the procedure that I have adopted for the last eight years. The sinus is opened where one is always sure to find it, just above the lachrymal groove: the whole of the orbital wall, that is the floor of the sinus, is completely removed, orbital galleries, temporal galleries, and other recesses thus being thrown into one large cavity. The mucous membrane is disturbed as little as possible. The ethmoid is now dealt with, all anterior cells, fronto-ethmoidal and orbito-ethmoidal being removed, and the cavity is joined to the frontal sinus by cutting through the ascending or frontal process of the superior maxilla and the nasal process of the frontal bone. This I regard as important since it brings the drainage far forward.

Further attention to the ethmoid is usually required, and often the whole of the cells are removed right back to the sphenoid. A large rubber drainage tube is now passed from the frontal sinus into the nose and stitched to the ala. The skin incision is completely sutured, no drain whatever being used.

The advantages of the operation are:—

- (1) Cosmetic.—There is no alteration of contour. The incision is made just under the supra-orbital margin and brought down in front of the inner canthus on to

Operations on the Frontal Sinus

the side of the nose. The skin being very thin in this region one gets a fine scar ; moreover, as it is in this situation that the shadow falls, often the scar is almost invisible.

- (2) From a surgical point of view the most complicated sinuses are easily dealt with, the ethmoid adequately displayed and the important anterior cells not overlooked, whilst the frontal sinus itself is drained freely into the nose through a large opening. The latter is situated directly below the anterior portion of the cavity, however large it may be.

It is not contended that the operation is entirely a new one ; few operations are, and the rough outlines have previously been described. But I know of no one who has given it an extended trial in a large number of cases. Unfortunately time does not permit of my going into the details which I believe alone command success, and I can only say that I regard the operation as a safe one, since I have not so far lost a case and I have never regretted the day when I first embarked upon it.

A PLASTIC LARYNGEAL OPERATION FOR VOCAL CORD PARESIS IN THE HORSE.*

By FREDERICK HOBDAV, C.M.G., F.R.C.V.S., F.R.S.E., Hon. Veterinary Surgeon to H.M. the King, and Examiner in Surgery to the Royal College of Veterinary Surgeons.

AS pioneer work in Surgery, as well as in other branches of Comparative Medicine, has of necessity frequently been done on animals before being specifically applied to man, it is always of interest to the thinking medical man to know something about the work of his veterinary *confrères*; for flesh is flesh (whether human or animal), and many human and veterinary operations run in similar grooves, the main differences being those connected with the application of the methods to the altered circumstances and surroundings, and those due to the idiosyncrasies of the patient.

There are very many ailments common to man and animals (vocal cord paresis being included amongst them), and the fact that I have now performed the ventricle stripping operation on more than 2000 horses in various parts of the world, and that I have the honour to be a member of the Laryngological Section, has induced me to again bring the results of these operations (which cover more than ten years of close observation) before you. Some of you may recollect that, in 1911, I read before the Section a paper on the results of the stripping of the laryngeal ventricle in horses, and the operation was then deemed inadvisable for application to man, on account of the fact that I was somewhat emphatic on the loss of voice which followed in my patients.

The late Sir Felix Semon brought up this aspect of the question which was the chief objection laid against it; for a man would much prefer, if it were a question of definite alternatives, to sacrifice his power to run a mile or two, rather than to submit to any operation which permanently interfered with his power of speech.

I had, at that time, only operated upon about 150 horses, and beyond casual questioning of the owners I had not paid much attention to this point, as it was not of vital interest to the

* A Paper read at the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, 3rd June 1921.

Vocal Cord Paresis in the Horse

owner, whose chief wish with a hunter is, naturally, that the animal should be able to gallop freely, when desired, without distress or without objectionable noise.

Now, however, after ten years have elapsed, I am able to tell you that in very many of my patients the voice has become restored—not perfectly, but still sufficiently to designate it a “muffled” neigh or whinny. I should therefore imagine that in the case of a human being, who has reasoning powers and can invent methods of application, it is probable that he will be able to speak afterwards quite audibly. At all events, in cases where there is bilateral abductor paralysis causing dyspnoea and involving risk of asphyxia, and in which the permanent wearing of a tracheotomy tube has been the only solution up to the present, I surmise that an operation which will permanently fix out of the way the paralysed vocal cords (which have become an obstruction) will be likely to give respiratory relief to a human patient in the same way that it does to a horse. This, however, must be left to the human laryngologist to decide, as I can only speak of it from the veterinary standpoint and tell you what it has done for the horse.

In the horse, we get a condition well known to owners as well as to veterinary surgeons, and especially to those who come in contact with hunters or race-horses, which is termed “whistling” or “roaring.” Both are due to paralysis of the left vocal cord which derives its nerve supply from the inferior laryngeal nerve, and the terms “whistling” or “roaring” simply indicate degrees in the progress of the disease.

During the initial stages when the left vocal cord commences to lag behind during the act of inspiration the sound of the respiratory air passing through is of a whistling character. A horse with the paralysis in this stage is termed a “whistler.” When the cord is completely paralysed, the characteristic “roaring” noise is made when a horse suffering from the ailment is galloped. Such an animal is spoken of as a “roarer.”

The condition is found in cart-horses as well as in other breeds, but it is quite a rarity to meet with it in small ponies. It is always the left vocal cord which is paralysed, and the paralysis, in a bad roarer, renders it quite impossible for such a horse to continue to gallop without distress and symptoms of dyspnoea. If forced exertion is persisted in the animal will be compelled to stop, or it falls down owing to deficient oxygenation of the blood.

Frederick Hobday

The larynx of the horse is built upon a similar anatomical plan to the larynx of man but on a much larger scale, and in this fact, for surgical purposes, the veterinary specialist has an advantage in that he has much more space in which to operate.

The true vocal cord in an average sized hunter is about an inch and a half long, and between this and the false vocal cord we find, as with man, the laryngeal ventricle.

The ventricle is sufficiently large in the horse to admit comfortably of the insertion of a man's middle finger, and the cavity of the ventricle is of sufficient depth to cover the middle finger well below the first joint.

The complete removal of the lining membrane of the ventricle is the operation alluded to in the title of this paper, and it is to the credit of Dr Williams, the Professor of Surgery in Cornell University Veterinary School, that the original application is due. I have considerably modified his technique, and it is the result of this modification which I am presenting to you to-day.

In the horse the operation is performed in the following way. The hair is shaved and the skin sterilised. Cocaine, stovaine, or some other local anæsthetic is injected subcutaneously, and an injection of adrenalin is administered; or, on the other hand, the patient may be chloroformed.

With cocaine alone it can be done in the standing position, but if chloroform is used the patient is cast, secured with hobbles, and placed on its back with its head and neck well extended and the throat exposed. It is the latter method which I shall describe here.

With an ordinary scalpel an incision is made directly over the crico-thyroid space, parallel to and exactly between the bellies of the sterno-hyoid muscles down to the crico-thyroid membrane, severing the crico-thyroid artery. The two cut ends of this vessel are picked up with Spencer Wells' forceps and the hæmorrhage is negligible. The next step is to incise the membrane during inspiration and expose the interior of the larynx, without injuring either the cricoid or the thyroid cartilage.

This to us is a matter of great importance, especially in the young horse, as injury to the cartilaginous structures almost invariably gives rise to ossification. The middle finger of the left hand is then inserted into the ventricle, and with the right hand a pair of long pressure forceps is introduced and made to

Vocal Cord Paresis in the Horse

grip the anterior extremity of the left true vocal cord which is raised and then rendered tense. With a knife of special design the edge of the true cord is carefully incised along its whole length, the incision being sufficiently long and deep to allow of the insertion of the left hand middle finger into the slit thus produced. The forceps are withdrawn and by digital manipulation of the first joint of the finger the mucous membrane is peeled off completely round the sac until it reaches the false vocal cord. At this stage the sacculle is gripped by a second pair of forceps and rendered tense, being then carefully incised along the edge of the false vocal cord. It is now free and can be removed. The right laryngeal sac is removed in a similar way and the operation is completed.

The patient is now allowed to come out of the chloroform; no suturing is done, and the external wound is afterwards treated with antiseptics and heals in about ten days. If preferred, a "burr" can be used to pick up the lining membrane, which is then everted and excised either with a sharp scalpel or a pair of scissors.

The animal is kept at complete rest for a month, afterwards being put to slow walking exercise and tested at a gallop after three months. It is then fit to recommence active work. In the case of an animal such as a cart-horse used for slow work, it may be returned to usefulness in five or six weeks.

For some time I have been hoping that the operation might find its application to the relief of some similar condition in man, and it was after seeing the recent case of bilateral abductor paralysis of the vocal cords brought before the Laryngological Section on 1st April 1921, by Mr Michael Vlasto, F.R.C.S., that I asked the permission of your President to again bring this operation before the notice of the members of the Congress.

This man, according to the clinical history given, suffers from stridor and breathlessness on exertion, which completely prevents him from carrying on his work, and I am given to understand that the condition actually jeopardises his life. The analogy in this respect between the man and one of my equine patients is complete. In fact he is a human "roarer." At the meeting at which I was present, the only suggestion made for the relief of the patient's symptoms was that of tracheotomy, and this used to be the only practical suggestion for a "roarer" horse until the plastic ventricle stripping operation was introduced. The permanent wearing of a tracheotomy tube in the

Frederick Hobday

horse is a nuisance both to the animal and his attendant, and I understand that in man it is just as objectionable.

In the horse, as in man, the tube has to be cleaned every day and accidents frequently occur, and, in addition, the cartilage of the trachea of some horses has a peculiar idiosyncrasy for granulating, and the granulations have to be frequently removed. This eventually terminates in local ossification and stenosis so that the tube has to be reinserted lower down. This can only be done a limited number of times, so that the operator always warns an owner that "tubing" is likely to be "the beginning of the end." The ventricle stripping operation is preferable, and it always has the advantage that even if it fails, the patient has tracheotomy to fall back upon.

I submit for your consideration that perhaps it might present similar advantages for the relief of certain pathological conditions in man. This is for you to decide.

BRONCHOSCOPY IN THE TREATMENT OF ASTHMA.*

By W. S. SYME, M.D., Western Infirmary, Glasgow.

AMONG the patients who come under the care of the rhinologist both in hospital and in private practice there are a certain number who complain of spasmodic asthma of various degrees of severity. In most of these cases the correction of a nasal deformity or the cure of a nasal or nasal accessory sinus affection leads to improvement in, and in some cases to cure of, the asthma. Especially does this hold with reference to antral or other accessory sinus disease. This is my experience. In some cases, however, the asthma is so severe or of such long duration that the appropriate operation on the nose is not followed by a beneficial result.

It was the consideration of a case of this nature which induced me five years or more ago to adopt the method of treatment with the aid of the bronchoscope. It was quite in the nature of things that the familiarisation of the bronchoscope should have suggested its use in asthma. The passage of the instrument is calculated, by the moral effect itself, to lead to amelioration in a condition in which the neurotic element is so conspicuous as it is in some cases of asthma. In severe cases, however, one would not expect the improvement to be of long duration. It seemed to me, therefore, that some additional treatment was required. Working on the hypothesis that the bronchioles have for their function the safeguarding of the lung tissue, and that from the lining of the respiratory tract reflexes pass to the bronchioles causing their contraction in the presence of hyper-irritation, it seemed to me that in asthma these reflexes are unduly active and that benefit was likely to accrue if they could be reduced.

The application of cocaine to the lining membrane has indeed this effect, but only temporarily. A more prolonged action was required. The deposition of a coating of oxide of silver suggested itself. A 10 per cent. solution of silver nitrate was used for this purpose. In the case to which I have referred the lining of the bronchi, and especially in the regions of the bifurcations where it appeared to be congested, was systematically swabbed after it had been anæsthetised with cocaine and adrenalin solution. For two days there was a fairly

* Paper read at the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, 3rd June 1921.

W. S. Syme

severe reaction like an acute bronchitis. After that the breathing became easy. At the end of a fortnight another application was made. The result in this case was so remarkable that I was induced to use the method in other severe cases. One patient had suffered for years from spasmodic asthma of such severity that during the year previous to his treatment he had been away from his work in the railway service for three months in the aggregate, and he was destined to lose his post. Since March 1916, when the treatment was carried out, he has never lost a day from asthma, nor indeed more than a day or two from any other cause. He had some time previously been operated on for antral disease and had been otherwise treated, but without benefit to the asthma.

In all, twenty-three cases with ages ranging from ten to sixty, have been treated in this way. Eighteen have had the application of silver nitrate solution on one occasion only, four on two, and one on four occasions. While one hesitates to use the word cure in connection with severe asthma where changes have taken place in the lung tissue, in twelve the benefit has been so decided that no spasmodic attacks of a severity sufficient to incommode the patient to any serious degree, or to keep him from his usual routine have occurred. Two, the youngest and a woman of fifty, report that they have derived no benefit. The others report improvement of varying degrees. One of these, a man of forty-six, who suffered from asthma for forty years, and had the appearance of a sufferer, was treated on two occasions. He writes that during the ten months following treatment he has not lost an hour's work, whereas during the previous winter he had been constantly off work. The headaches from which he suffered and which he described as awful have never returned. He is still, however, somewhat asthmatic, and with lungs as emphysematous as his are I don't see how it could be otherwise.

In nearly all of these cases other methods of treatment had been tried. I am sufficiently wise to look for no panacea for all cases of such a complex problem as asthma and, I trust, sufficiently modest not to make such a claim for this method; but though my experience has not been large I feel that the procedure has justified its adoption, and I hope that it will find similar justification in the hands of others in cases so severe that they are not only distressing but extremely troublesome to those who have to treat them.

TONSILLAR HÆMORRHAGE.

By J. L. AYMARD, M.R.C.S., L.R.C.P., Port Elizabeth. Late Aural Specialist and Plastic Surgeon, The Queen's Hospital for Facial Injuries and Cambridge Hospital, Aldershot.

OPERATIONS for the removal of tonsils are, I believe, unique in one respect in surgery—viz., in the almost entire neglect shown by the majority of operators to adopt the ordinary means for the arrest of hæmorrhage such as is employed in other parts of the body. At a later date, history will refer to this omission in scathing terms. This has been largely brought about by the fact that incomplete removal has been and is being practised by general surgeons with almost complete satisfaction to themselves.

Another point on which I must comment and which amounts almost to a fetish is the desire to perform the operation in the shortest possible period, no matter what after-trouble ensues.

I have for several years past adopted a very definite procedure, and I never commence to remove the second tonsil until the surface occupied by the first is absolutely dry; I always point out this to my anæsthetist. I employ a very light anæsthesia with coughing reflex always present, the child or adult lying comfortably flat: the mouth is kept open by a Ferguson gag and care is taken never to over-gag. The tongue is never fixed. I take it that, given a patient over-gagged, deeply anæsthetised, with tongue fixed, then all the elements of disaster are present. Having secured my tonsil with forceps (I use a uterine tenaculum), I make one clean incision which does not include the plica triangularis. I complete quickly the separation of the capsule with knife or finger, place a pair of Kocher forceps upon the tissues below and divide with scissors. I then place a large pad of gauze in the cavity and hold the same in position with my forefinger. The anæsthetist now gives a little more, preparatory to the next stage, viz.—searching for the spouting artery or arteries. For this purpose I am convinced there is only one light and that is a direct searchlight. I have again and again detected a vessel unseen by the reflected light. I always use my throat lamp, made by Allen & Hanbury; its simplicity commends itself. It consists of a flattened metal tube through which pass the wires to a lamp at one end and battery at the other. The lamp should be of $4\frac{1}{2}$ volts with a

J. L. Aymard

white background; this is important, otherwise some light is thrown back upon the observer. (Such lamps are sold at every electrical shop, with battery to correspond.) I remove the swab, place the lamp right down the back of the tongue, and with Kocher forceps secure any bleeding spot. Long use makes one very quick at detecting the source. Upon an average I use two forceps for each tonsil. If the surface is shining from blood, though not extensively, I know that the same may eventually cause a big clot. I therefore search for the offending vessel, which is usually just behind the anterior pillar. An appearance resembling strings of fibrin stretching across the cavity is frequently found to be due to spouting arteries.

Having made quite certain that the surface is now perfectly dry, I apply a swab of compound tincture of Benzoin—wait a few minutes, and then proceed to remove the other tonsil. I remove adenoids with my scissors and also apply pressure and dress the surface.

I am more than convinced that many of the cases of pharyngeal trouble of later years can be traced to the severe laceration caused by the curette in careless hands.

In conclusion, I am convinced that the procedure of sewing the pillars together for the control of hæmorrhage, either surface to surface or over gauze (soon to become septic), is unsound surgery, and that hæmostatic machines should never be used. The correct surgical procedure is to secure the vessel.

I do, however, advocate and now practise, as a routine, the sewing together of the loose mucous membrane covering the pillars in the adult, which is quite a different matter. This operation reduces the pain and subsequent local swelling almost to a minimum.

I bring the membrane together upon each side with one mattress suture. I use No. 1 stained catgut, Reverdin's needle, and my simple catgut-holder. Although the membrane will now appear to be stretched across the exposed muscular surface, contact by swelling soon takes place in the adult. If, however, all hæmorrhage has not been previously controlled, the reverse will take place and a large hæmatoma result. The mucous membrane, it need hardly be added, requires careful handling, although not so readily lacerated in the adult as in the child. I use a mattress suture, and obtain admirable results, being careful to see that the soft palate is quite even at the conclusion of the operation.

CRITICAL REVIEW

ASTHMA AND ANAPHYLAXIS.

By CHARLES McNEIL, M.A., M.D., F.R.C.P., Edinburgh.

THERE has been a definite advance in our knowledge of asthma in the last decade, and this advance has been chiefly due to the recognition of a basis of anaphylaxis in at least half the cases of asthma. The association of anaphylaxis with asthma is proved by the positive cutaneous protein reactions obtained in those cases. In this review it is proposed to give a brief account of recent work on experimental anaphylaxis and of the cutaneous tests as applied to asthma, and also to discuss briefly the constitutional factor in asthma.

Experimental Anaphylaxis.—Anaphylaxis is a much abused term at the present time, and has been carelessly used to describe almost any reaction of living tissues to irritation. Before dealing with the relation of anaphylaxis to the clinical condition of asthma, it will be well to examine this peculiar reaction as shown in the exact conditions of animal experiment. Most of our knowledge of anaphylaxis is derived from a study of the guinea-pig sensitised to horse-serum, and to a lesser extent of the dog, cat, and rabbit. But the original classical experiment by C. Richet,¹ who was the first to describe the condition in 1902 and to give it its name, was on the dog by the subcutaneous injection of *congestin*, a highly irritant poison extracted from the tentacles of certain sea-anemones. Most of the later experimental work on the condition has been done on guinea-pigs, dogs and rabbits, with inert animal sera, and especially horse-serum.

In the guinea-pig, the intravenous reinjection of horse-serum, a definite number of days after the primary injection, is followed by immediate severe symptoms and by death in a few seconds, and death has been shown to be due to acute constriction of the bronchial muscles and suffocation. It is a condition of acutely fatal asthma. This experiment is known as the Theobald Smith² phenomenon.

Another important experiment was made by Arthus³ on the rabbit, in which after repeated subcutaneous injections of horse-serum great swelling and even sloughing appeared at the site of reinjection. This is really a positive cutaneous reaction, and is known as the Arthus phenomenon.

These two experiments are very important, for it seems probable that they present the two essential features of the anaphylactic reaction, whether in clinical conditions or in an animal experiment. The first is a tonus or constriction of unstriped muscle; the second is a depressor and vasodilator action on capillary endothelium. Dale⁴ brings this out very clearly in his recent Herter lectures, emphasising

Charles McNeil

this twofold reaction of living tissues in anaphylaxis. But he also shows that the relative degree of the two reactions is not the same in different animals; that in the guinea-pig the tonus of plain muscle is intense and predominant, especially in the bronchial muscle, while the depressor effect on capillary endothelium is present only in minor degree; while in the dog a general capillary engorgement is the outstanding feature of the anaphylactic reaction, and that a constrictor action upon plain muscle is relatively trivial.

Now in man we have in serum-disease—the symptoms occurring after a second injection of antitoxic sera—conditions approximating to those of the above animal experiments. And it is noteworthy that the phenomena of serum-disease, urticaria, arthritis and fever, indicate rather a toxic action upon capillary endothelium than a constrictor action upon plain muscle. Goodall's⁵ observations upon 200 cases of serum-disease confirm this, for he does not mention asthma as one of the symptoms. Further, in that intense type of serum-disease, known as "immediate reaction," there is very severe and general vasomotor depression, shown in the cyanosis, coma, collapse, high fever, and rapid appearance of the rash, and asthma is either not present or is entirely masked by the intense vascular depression. So that in serum-disease—the form of human anaphylaxis most closely resembling that of animal experiments—the reaction in man is more akin to that in the dog, where death takes place from general arterial depletion, than to that in the guinea-pig, where death is due to acute asthma and suffocation.

Clinical Anaphylaxis and Asthma.—If asthma does not occur in man in the definite and limited conditions of experimental anaphylaxis, we have still to give proof of the association of anaphylaxis with asthma as occurring clinically in man, for example in hay-fever, in the various animal asthmas, and in the large group of spasmodic asthmas and bronchial asthmas. In the first two groups, proof is given by the positive cutaneous reactions obtained by applying pollen and the various animal substances to a small skin abrasion. By this procedure, the specific substance is brought into contact with capillary endothelium, and produces in a few minutes a wheal. A positive skin test is in fact the demonstration of the Arthus phenomenon in a mild degree. And in the third group of spasmodic and bronchial asthmas, positive skin reactions to one or more of a great variety of substances have been obtained in at least one-half of the cases. In these various clinical types of asthma, anaphylaxis must be induced under quite different conditions from those in animal experiments: and it is through the mucous membranes of the respiratory and alimentary tracts that the foreign protein substance must enter the body, and produce first sensitisation, and later the anaphylactic reaction.

Asthma and Anaphylaxis

In a large number of cases of asthma, the clinical history alone will suggest the exciting cause, *e.g.*, incidence of attacks in the hay season, proximity to animals, horses, cats, etc., some special occupation, the onset of symptoms after eating particular foods. If this suggestion is confirmed by a positive cutaneous test with the corresponding substance, the cause of the asthma and its anaphylactic nature have been demonstrated, and an opportunity of specific and radical treatment given.

There now exists a considerable body of published work on cases of asthma investigated and treated by these new methods. The pioneer clinical work was done by Noon⁶ and Freeman⁷ on hay-fever. In 1916, Cooke and Vander Veer,⁸ published a large series of 621 cases of sensitisation, nearly all being cases of hay-fever. More recent papers are those of Goodale,⁹ Walker,¹⁰ and Coke.¹¹ A brief account may be given of Walker's 400 cases of bronchial asthma. Of this number, 191, or almost 50 per cent., gave positive cutaneous reactions; 78 to one or more animal hairs; 68 to food proteins; 33 to bacterial toxins; and 92 to pollens. A good many patients reacted to more than one protein. This frequency of multiple sensitisation in one individual is also shown in Cooke and Vander Veer's paper, where it was present in 42 per cent. of their large series; and it has also been emphasised by Freeman,¹² and Coke. A positive skin reaction is defined by Walker as a wheal not less than 5 millimetres in diameter, developing in from ten to thirty minutes, with a typically irregular periphery; but Freeman points out that the reaction may be delayed, and especially in the bacterial tests. Walker gives special attention to the age of onset, showing that the percentage of positive reactions is much higher under fifteen years than at later ages, and also that the younger the age of incidence, the more likely is the asthma to be a food-protein anaphylaxis.

As to results, Freeman¹³ reported, in 1914, on 84 cases of hay-fever treated by specific vaccination, a complete cure or great improvement in 64 per cent. Goodale gives much the same percentage in 123 cases of hay-fever, observed for a period of two years or more, and emphasises the superiority of prophylactic over phylactic treatment. Walker also gives results of specific treatment in 48 cases of horse-asthma, the symptoms being "relieved" in 63 per cent.: while in 34 cases with positive reactions to certain cereal foods, the condition was "relieved" by omission of the offending foods.

There remains that large group (50 per cent.) of cases of asthma where no positive cutaneous reactions are obtained even with a large number of protein test substances. This figure, given by Walker, is accepted by Coke and others. Are these cases of asthma also to be accepted as cases of anaphylaxis, the exciting protein cause being unknown? Coke is inclined to this, as a hypothesis. But Hurst¹⁴

Charles McNeil

in a recent paper has pointed out other possible causes, a reflex stimulation of the bronchial centre in the medulla from irritants and lesions of the nose, bronchi, stomach, and bowels, and even a purely hysterical and emotional condition. In the meantime, it is safer to leave unexplained this large group of asthmas with negative cutaneous reactions.

It is clear, however, that the use of the cutaneous tests, and our interpretation of them as phenomena of anaphylaxis, mark a great advance in our knowledge of asthma, especially in accuracy of diagnosis, but also in efficacy of treatment.

The Constitutional Factor in Asthma.—The modern doctrine of asthma as an anaphylactic reaction has not cleared away all the obscurities of the subject. There is the mysterious influence of heredity, which, in asthma, is an important factor. Cooke and Vander Veer found in their series of 504 cases a positive history of some sensitisation in an ancestor either direct or collateral in 482: and the same thing is shown by Freeman in the family history diagrams published in his last paper.¹³ Most authorities are agreed that what is transmitted from parent to child, is not a specific anaphylaxis, but a tendency to develop anaphylaxis to any form of protein. The child acquires an anaphylaxis much more readily than do other children. The age-incidence of asthma is also in favour of the view that there is some constitutional factor at work. John Thomson¹⁵ in an analysis of 100 cases of asthma found the onset in 71 to be in the first five years of life. This constitutional tendency is too difficult and obscure to elucidate in our present knowledge; but the age-incidence and the strong hereditary tendency in asthma make its existence a reasonable conjecture and give it a place with anaphylaxis in the conditions that produce asthma. Auld's¹⁶ successful treatment of asthmatics by peptone—a treatment which is non-specific, but which seems to reduce the constitutional liability to anaphylaxis—seems to point in the same direction of a constitutional factor in asthma.

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SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

President—Dr W. JOBSON HORNE.

March 4, 1921.

Cystomata of the Larynx (Synopsis of an Epidiascopic Demonstration)—Dr W. JOBSON HORNE.—Under the term “cystoma of the larynx” have been included conditions clinically alike but not pathologically akin. This explains the differences of opinion expressed as to relative frequency. Sir Morell Mackenzie regarded cystic tumours of the larynx as comparatively rare, whereas Moure, quoted by Bosworth, regarded cystomata as the most common of all the benign growths in the larynx with the exception of papillomata.

The number of cases I have seen, and have been able to collate from the Proceedings of the Laryngological Society of London and of this Section, would not support the views held by either of these observers. The question therefore arises, what may be regarded as *veritable cystomata* of the larynx and what conditions may simulate them.

True cysts of the larynx are *retention cysts* and *congenital cysts*. The former occur only in those parts of the larynx where epithelial glands are found. Hence retention cysts are more commonly found on the epiglottis. Congenital cysts are rarely seen, inasmuch as they occur within the ventricle of the larynx. Close to the anterior commissure, the roof of the ventricle, *i.e.*, the ventricular band, is thinned and through it a congenital cyst might herniate.

The conditions simulating cystomata, or *pseudo-cystomata*, are polypi and growths which have undergone cystic degeneration; eversion of the sacculus laryngis—commonly called prolapse of the ventricle—and circumscribed œdema on the glottic aspect of the arytenoid region.

An Account of Two Cases of Obstruction of the Œsophagus by a Foreign Body acting as Ball-valve—Mr SOMERVILLE HASTINGS, M.S. CASE I.—A woman, aged 30, after severe vomiting in September 1907, suddenly became unable to swallow anything either solid or fluid. A bismuth meal showed a constriction of the œsophagus, a little above the level of the heart, with marked dilatation above it: A diagnosis of malignant stricture was made. After two years her power of swallowing improved. Eight years ago she suffered from another similar attack, which improved after six weeks.

In September 1920, the trouble again recurred, and she presented

Societies' Proceedings

herself at the Middlesex Hospital on 26th November 1920. The œsophagoscope was passed, and 11 ins. from the incisor teeth a large cherry stone was found, resting like a ball-valve on a smooth fibrous stricture of the œsophagus, with a lumen not quite large enough to allow the cherry stone to pass. The œsophagus above this was much dilated. After the cherry stone had been removed the swallowing once more became normal, and when last seen on 4th January 1921, the patient stated that she had put on weight and could eat anything.

CASE II.—Woman, aged 52. For several years she had had occasional difficulty in swallowing, which had always been relieved by manipulation of the neck. On the day of admission, she was eating some Scotch broth with some rather hard peas in it, when sudden obstruction occurred and she was unable to swallow fluids or solids of any kind. At 10 P.M. on the same day the œsophagoscope was passed, and 8 ins. from the upper incisor teeth a large hard pea was seen. The mucous membrane appeared sloughy, and a round constriction, not large enough to admit the pea, was seen. She has had no further trouble.

Case of New Growth in the Left Bronchus—Sir JAMES DUNDAS-GRANT, K.B.E., M.D.—A middle-aged man, with cough and shortness of breath of twelve months' duration. Tubercle bacilli were never found. The larynx was normal. Direct examination by bronchoscopy revealed in the left bronchus a pale flapping growth with indistinct fimbriation. The growth was removed by lower bronchoscopy after tracheotomy.

Two years later the stridor reappeared. On direct bronchoscopy a smooth rounded growth was seen in the left bronchus. The bronchus appeared to be narrowed. It is proposed to carry out removal again after reopening the trachea.

The X-rays show "shadows at the hila very heavy and woolly; lungs translucent; no evidence of deficiency of the air-entry seen."

No microscopic examination of the tissue could be made.

Case of Fixation of Vocal Cord following Healed Tuberculosis of the Larynx—Sir JAMES DUNDAS-GRANT, K.B.E.—A middle-aged man. There is almost complete fixation of the left vocal cord without any material infiltration of the aryepiglottic fold. The immobility is probably mechanical and caused by cicatricial changes following tuberculosis.

Case of Chronic Suppuration of the Antrum of Highmore treated by the Canfield Operation—Sir JAMES DUNDAS-GRANT, K.B.E.—Female, aged 18, had suffered from discharge from left antral cavity for three years. Treatment by irrigation had been without effect. By opening the antrum through the anterior angle, that area of the cavity could be better dealt with than was possible either

Royal Society of Medicine

through the canine fossa or through the inferior meatus of the nose. He thought the canine fossa route involved more laceration.

Bilateral Paralysis of the Internal Tensors of the Larynx

—Mr PHILIP FRANKLIN, F.R.C.S.—Girl, aged 12. Loss of voice for six months; sudden onset since the age of 4. Several attacks of aphonia lasting a few days.

Notes of a Case of Pharyngeal Pouch removed from a Male, aged 72—Dr W. H. KELSON.—Patient, a man aged 78, had a large pharyngeal pouch removed by exhibitor seven years ago. Complete relief of all symptoms followed until February of the present year when he came complaining of slight difficulty in swallowing, but there was no regurgitation of food. Oesophagoscopy showed marked dilatation at the site of the former pouch, and at the bottom of this there was annular constriction.

The skiagram indicates the presence of malignant disease.

Carcinoma was found post-mortem at the seat of the former pouch.

Case of Left-sided Glosso-palato-vagal Paresis—Mr W. M.

MOLLISON.—A female, aged 35, with aching of the throat and loss of voice for two days. The tongue was protruded towards the left side, and the left side was less resistant. The soft palate was drawn up to the left side on phonation. The left vocal cord was stationary. The trapezius and sterno-mastoid on the left side were weak.

The Wassermann reaction is negative.

Case of Lingual Thyroid—Mr GEORGE BADGEROW, C.M.G.—

A female, aged 25. A tumour is seen at the base of the tongue, which causes no difficulty in swallowing or breathing, nor does it interfere with speech.

Bilateral Abductor Paresis of Cords with Simple Enlargement of Thyroid—Mr C. F. BEEVOR, M.B.—A male, aged 16. There is a soft regular enlargement of thyroid, both lobes and isthmus being affected. Examination of larynx shows partial bilateral abductor paresis of cords. Patient can lie down in bed comfortably; stridor can always be heard, but is much more marked on exertion.

SECTION OF OTOTOLOGY

February 18, 1921.

President—Sir CHARLES BALLANCE, K.C.M.G., C.B., M.V.O., M.S.

ABRIDGED REPORT.

Zinc Ionization and Electrolysis in the Treatment of Chronic Otorrhœa—Dr A. R. FRIEL.—(Published in *Medical Press and Circular*, 9th March 1921.)

Societies' Proceedings

Mr GAY FRENCH.—The cases which I have so far treated with zinc ionization are sixty-three. Complete cessation of discharge after one treatment, eighteen—(six of these were treated over a year ago). Twenty-four cases required two to six treatments (most of these were old-standing cases with granulations). Twenty-one cases proved failures; of these, eight are definitely better, but the ear still remains moist; six were subsequently operated on—two were found to have cholesteatoma, and four had old-standing involvement of the mastoid. Personally, I consider this method of treatment is far better than any other. I also consider it useful from the diagnostic point of view, inasmuch as failure generally denotes some involvement of the mastoid.

Paralysis of Eye Muscles in connection with Mastoiditis; Recovery—Mr W. M. MOLLISON.—In two cases paralysis came on in the course of mastoiditis. (1) After operation for acute symptoms arising in the course of a chronic suppuration; (2) in the course of simple acute mastoiditis. In the latter, there was no rise of pressure in the cerebro-spinal fluid. In the first case, the fluid was under increased pressure and slightly cloudy. In neither was extension of disease found towards the tip of the petrous. The eye paralyses were probably due to metastatic infection, almost certainly meningeal and not nuclear or central. In both, recovery was complete. Both cases had certain features in common; pain about the affected eye, nausea (or vomiting), slow pulse, combined with paralysis of the levator palpebrae superioris; but in the first case paralysis of the third cranial nerve, in the second of the sixth cranial, was present.

Middle-Ear Suppuration with Paralysis of the External Rectus Muscle of the same side—Mr ARTHUR J. HUTCHISON.—Boy, aged 7; measles, 5th June 1918. Complained of pain in left ear, 12th June 1918. After paracentesis, pain ceased and temperature dropped to normal; 17th June 1918, temperature 102° F., accompanied by shivering; 6th July 1918, paralysis of the left external rectus. Hutchison found only red inflamed bone but no pus, except in the antrum and attic. Normal dura mater in middle fossa. Five days later, temperature 103.8° F., vomiting and stiffness of the neck. Lumbar puncture gave turbid fluid (streptococci). Antistreptococcus serum injected daily, both into the flank and into the spinal canal. Death on 16th July. No post-mortem.

Complete Bilateral Abolition of Acoustic and Vestibular Reactions following Cerebro-spinal Fever—Mr ARCHER RYLAND.—Male, aged 22, hearing normal when he joined the army. Cerebro-spinal fever in November 1917. On recovery, complete deafness in both ears. Tympanic membranes appeared normal; audition abolished; cochleo-palpebral test negative; Lombard voice-

Royal Society of Medicine

raising test negative; vestibular systems, no response. He still has tinnitus. Romberg's sign negative. No vertigo. Pointing test, and Babinski-Weil test, show no deviation. The patient himself stated that his illness had commenced with headache and vomiting, pain in back and giddiness. "The medical officer was talking to me until suddenly I could not hear what he said, although I knew he was talking, as I could see his lips moving. . . . For a month I was delirious, and during this time I had eighteen lumbar punctures. . . . In February 1918, I could not move my back. . . . About April I started to walk, holding the back of a chair. . . . They found I had got a curvature of the spine, and made me do physical exercises."

Epithelioma of Auricle—Mr NORMAN PATTERSON.—Man, aged 67. Nine years ago was operated on for epithelioma of the right auricle. He had a very large mass of glands in the neck. The auricle was removed and an extensive operation carried out in the neck, which entailed removal of a large portion of the sternomastoid and internal jugular. (*Lancet*, 1913, i., p. 962.)

Cirsoid Aneurysm involving the Temporal Bone and Neck—Mr NORMAN PATTERSON.—Female, aged 46. Discharge from and deafness in left ear since childhood; pain occasionally; facial paralysis, six weeks; giddiness for three months. No nausea, vomiting or tinnitus. Weber to right; bone conduction shortened; aural polypus filling meatus. Rotation—right to left, no nystagmus; left to right, nystagmus four seconds.

First operation (16th August 1920)—Post-meatal wall eroded, severe venous hæmorrhage from origin of polypus. Second operation (20th September 1920)—Again severe hæmorrhage. (Pathological report—Inflammatory polypus, no sign of malignancy.) 11th January 1921—Pulsating expansile swelling in left anterior triangle with systolic thrill. Left tonsillar region visibly pulsates. Left facial paralysis still present along with paralysis of left vocal cord and left hypoglossal. Left pupil slightly dilated. Pressure on common carotid causes pulsation to cease.

March 18, 1921.

President—Sir CHARLES BALLANCE, K.C.M.G., C.B., M.V.O., M.S.

ABRIDGED REPORT.

Dr ALBERT GRAY gave a lantern-slide demonstration illustrating the pathological conditions found in two cases of septic meningitis.

Injuries to the Ear in Modern Warfare—Mr T. JEFFERSON FAULDER and Mr LIONEL COLLEDGE.—Published *in extenso* in the *Journal of Laryngology and Otology*, June 1921, pp. 277-283.

Societies' Proceedings

A Device for Tuning-Fork Testing—E. A. PETERS, M.D., F.R.C.S., and R. LAKE, F.R.C.S.—The device is for attachment to tuning-forks when testing bone-conduction. The greater the pressure on the bone the longer are the vibrations heard by the patient. When the pressure is 8 oz. the fork is heard by the normal person for twenty-nine seconds; when the pressure is 16 oz. the sound is heard eight to ten seconds longer.

Two Cases of Lateral Sinus Thrombosis without Otorrhœa—W. M. MOLLISON.—CASE I.—Miss H., aged 20. Four weeks ago influenza? For fourteen days deaf in the left ear and earache; for ten days pain over left mastoid and occipital region. Temperature 104° F. on several occasions. No rigors. Left membrane dull; whisper at 2 ins. Operation: granulations in antrum leading to the lateral sinus; on the sinus small collection of pus; wall resistant. Sinus opened backward till bleeding met with at the junction with the superior petrosal sinus; internal jugular ligatured. Two days later re-operation, as temperature high; sinus thrombosed $1\frac{1}{2}$ in. farther back. Recovery. The bleeding from the superior petrosal sinus at the first operation was sufficient to suggest that the limit of thrombosis had been reached, whereas clot really extended $1\frac{1}{2}$ in. beyond.

CASE II.—Mr Y., aged 17. Ten days' earache (left); temperature rose steadily till six days ago, when it was 104° F. Mastoid tender but no otorrhœa. Mr Sheaf operated and found pus in the mastoid; exposed a small area of sinus and thought it normal. Temperature remained at 102° . Patient looked ill and felt cold; tongue dirty. Second operation: in the angle between the posterior and middle fossæ, an extradural abscess was found; the sinus clot was not complete. It was turned out, and the internal jugular vein ligatured. Recovery.

DISCUSSION.

Mr SYDNEY SCOTT said he had published, eleven years ago, two cases of extradural abscess in which the tympanic membrane was never perforated; the drum was absolutely normal and hearing perfect. Brain abscesses, traceable to non-perforative otitis media, had been met with in which post-mortem examination showed adhesions with a direct track between the abscess and some cells of the middle-ear.

Sir WILLIAM MILLIGAN considered it unlikely that such cases occurred without infection of the middle-ear, though such infection might be of a transient nature, so that at the time of examination no actual evidence of it remained. Infection might occur through the petro-squamosal sinus of a vestigial vein, which opened directly into the sinus after running across the tympanic roof. He had seen only

Royal Society of Medicine

one case of sinus thrombosis in which there was no clinical evidence of middle-ear disease. The responsible organism was the pneumococcus.

Dr H. J. BANKS-DAVIS recalled a case in which Sir Charles Ballance opened a cerebellar abscess in a baby. At the time of operation there was no rupture of the tympanic membrane.

Mr MUSGRAVE WOODMAN mentioned the case of a girl, aged 9, with acute pain over the left mastoid, and some swelling in the neck. The drum was injected but not bulging (no otorrhœa). The lateral sinus was thrombosed. The jugular vein was tied. Recovery. Mr Woodman had operated upon the opposite ear four years previously, and the lateral sinus was also thrombosed; otorrhœa however was present. In this case there was a curious anatomical condition present on both sides, the sinus took a sharp bend forward at an acute angle, and was separated from the mastoid only by a thin plate of bone.

Mr FAULDER had had a case of bilateral inflammation of the mastoid, which cleared up on one side but had to be operated upon on the other. There was no evidence of middle-ear disease on either side. The mastoid was diseased, and this was associated with abscess of neck glands on the same side.

The PRESIDENT had seen one case of acute osteomyelitis of the mastoid which had nothing to do with ear disease. He had seen three or four unusual cases following influenza, in which there had been a slight discharge from the ear, then the tympanum had healed, and the suppuration had extended backwards to the mastoid, the lateral sinus or to the brain. He remembered the case of a healthy boy, aged 6, with a hare-lip. He cured the hare-lip. At the end of three weeks the sister said the boy was not well and the wound, which had healed perfectly, was beginning to break down. The boy would not take his food. Occasional temperature of 99° F. Many petechial spots were noted about the body. The ears and every part were examined. The boy died. At post-mortem extensive disease of the petro-mastoid was found. There was suppuration in the lateral sinus. The internal organs were covered with petechial hæmorrhages.

Mr. F. J. CLEMINSON had treated a boy, aged 10, with a red fluctuating swelling over the right mastoid; he had a perfect tympanic membrane and normal hearing. At operation he found a fistula leading from the abscess cavity to the lateral sinus. The sinus was healthy. The case might have been one of acute tuberculous osteomyelitis in the bone over the lateral sinus.

Societies' Proceedings

THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

ROYAL INFIRMARY, EDINBURGH.

June 12th, 1920.

President—Dr W. T. GARDINER.

Notes on a Case of Cavernous Sinus Thrombosis and Meningitis, in all probability Secondary to Suppuration in the Left Tear Sac—A. LOGAN TURNER, M.D.—Female, aged 19, nurse in a fever hospital, developed a slight cold and suffered from headache and rise of temperature. Swelling on left cheek showed itself first over position of tear sac. Œdema of both eyelids. Left eyeball proptosed; chemosis of lower half of ocular conjunctiva; pupil contracted and apparently immobile; movements of eyeball restricted: no optic neuritis, but veins dilated.

Left antrum proof punctured with a negative result; orbit explored for pus, but none found; ethmoidal cells opened, but free from pus. A few drops of pus escaped from superficial incision in proximity to tear sac. Cerebro-spinal fluid turbid; great increase in polymorphs: numerous organisms. Death.

Section.—Cavernous sinus thrombosis; meningitis extending from it; all accessory sinuses normal.

Two Patients with Sarcoma of the Upper Air Passages treated with Radium—A LOGAN TURNER, M.D.:—

(1) Male, aged 35. Sarcoma of right tonsillar region, lateral wall of pharynx, and base of tongue.

(2) Female, aged 29. Sarcoma of nasopharynx.

In both cases, rapid disappearance of the tumour followed the insertion of the radium tube into the tumour tissue.

Closed Empyema of the Left Ethmoid with Displacement of the Eyeball—Dr W. T. GARDINER.—Boy, aged 7. Severe cold in head fourteen days previously; swelling formed above inner canthus, œdema of eyelids and displacement of eyeball outwards and downwards. Œdematous middle turbinated removed and ethmoidal cells opened; pus evacuated. Glairy mucus washed out of left antrum.

Fixation of Left Cord and Extreme Mobility of Left Arytenoid Eminence—Dr. W. T. GARDINER.—Female, aged 19, complained of hoarseness of fourteen days' duration, due to a cold. On phonation, left arytenoid cartilage, which flaps across in front of the right arytenoid, hides the left cord from view.

Since early childhood voice has been slightly husky. Wassermann and chest examination negative.

Otological and Laryngological Society

Malignant Disease of Nose and Nasopharynx—Drs W. T. GARDINER and J. M. DARLING.—Female, aged 60, with an irregular mass occupying the vault of the nasopharynx, growing apparently from the basisphenoid and involving the upper and posterior part of the bony septum. Tissue removed for microscope. A severe attack of erysipelas followed; the tumour disappeared.

Case was one of malignant tumour of transitional type.

Three Cases of Sigmoid Sinus Thrombosis—Dr J. MALCOLM FARQUHARSON.—Patients aged 10, 14, and 32 years respectively. All suffered from chronic otorrhoea. In one the condition was complicated with a small cerebellar abscess; in one there was osteo-myelitis of the occipital bone, and in the third, the patient developed an attack of malaria, parasites of benign tertian type being found in the blood. In the three cases the internal jugular was ligatured and recovery took place.

Epithelioma of Right Vocal Cord—Dr E. P. MATHERS.—Male, aged 46. Hoarseness of 15 months' duration. Warty growth at junction of anterior and middle thirds of R.V.C. Free movement of cord. Laryngo-fissure.

Patient is shown four years after operation with no recurrence.

Two Cases of Intrinsic Cancer of Larynx—Dr J. S. FRASER.—(1) Male, aged 76. Hoarseness, 3 months. Irregular growth on middle third of R.V.C. Mobility of cord fairly good. Laryngo-fissure.

No recurrence one year after operation.

(2) Male, aged 69. Hoarseness for 4 months. Irregular red growth occupying nearly whole length of L.V.C. Mobility of cord very good. Laryngo-fissure.

Patient, who had a high blood pressure, died from cerebral hæmorrhage about one month after operation.

Two Cases of Accessory Sinus Suppuration, with Fatal Complications—Dr J. S. FRASER.—(1) Male, aged 30. History of nasal polypi. Pus in both nasal cavities. Skiagrams show cloudy appearance of several sinuses. Resection of septum for better access; removal of middle turbinals; both sphenoidal sinuses opened. Empyema of right pleural cavity opened. Hectic temperature; delirium.

Section—Blood sinuses of skull healthy. Congestion of internal organs. General blood infection.

(2) Male, aged 45. Recent acute nasal catarrh followed by swelling at upper and inner angle of left orbit, and subsequently development of signs characteristic of cavernous sinus thrombosis. No pus in the nose. Intranasal operation on left ethmoidal cells with negative result. External operation on left frontal sinus and orbital

Societies' Proceedings

cavity, but no pus found. Distinct improvement in local condition. Patient's mental and general condition justified exploration of anterior cranial fossa. No extra or subdural abscess found; no frontal lobe abscess. At post-mortem diagnosis of cavernous sinus thrombosis confirmed, with suppuration in left sphenoidal and antral cavities; slight basal meningitis.

Chronic Middle-Ear Suppuration (right) of Traumatic (?) Origin. Radical Mastoid Operation followed by Labyrinthitis, Meningitis, and Death—Dr J. S. FRASER.—Male, aged 23, suffered from fracture of the base in January 1919. Examined in April on account of discharge from right ear associated with a very narrow meatus. Conservative treatment tried; later radical mastoid operation performed; labyrinthitis, basal meningitis, death.

Post-mortem showed old fracture of base passing through roof of right tympanum.

Case of Streptococcus Mucosus Otitis Media, followed after long interval by Septicæmia, Meningitis, and Death—Dr J. S. FRASER.—Male, aged 43, seen on 5th May 1920, with history that five or six weeks before, the patient had a severe cold, followed by earache but no discharge. Earache and headache disappeared. On 1st May recurrence of headache; on 5th May signs of meningitis; mastoid operation and lumbar puncture; antrum contained pus; cerebro-spinal fluid and the blood contained streptococcus mucosus capsulatus.

Case of Cerebellar Hernia, following on Radical Mastoid Operation — Perisinus Abscess — Sinus Thrombosis — Cerebellar Abscess—Dr G. EWART MARTIN.—Male, aged 10. Various attempts were made to reduce the hernia cerebelli; applications of 40 per cent. formalin, ligation, repeated lumbar punctures; persistence of hernia.

An Unusual Injury of the Ear (Penetration by Wire Fence), involving the Facial Nerve—Dr DOUGLAS GUTHRIE.—Male, aged 15. When pulling up a piece of wire fence, the end suddenly became loose and entered his right auditory meatus. Giddiness, sickness, and vomiting: facial paralysis was first noticed three days after the accident. Pus from ear three weeks later. The facial paralysis almost entirely disappeared.

Traumatic Nasal Deformity treated by Transplantation of Costal Cartilage—Dr DOUGLAS GUTHRIE.—Female, aged 20. A piece of seventh costal cartilage transplanted to form new nasal bridge.

Notes of Four Cases of Brain Abscess—Dr T. RITCHIE RODGER.—(1) Male, aged 19. Chronic suppuration right ear; sigmoid sinus thrombosis and temporo-sphenoidal abscess. Recovery.

Ear

(2) Female, aged 15. Chronic suppuration, bilateral; serous meningitis; left cerebellar abscess. Death.

(3) Male, aged 18. Acute suppuration right ear; temporo-sphenoidal abscess; meningitis. Death.

(4) Female, aged 32. Chronic suppuration left ear; temporo-sphenoidal abscess; inflammatory oedema of brain. Death.

ABSTRACTS

EAR.

Latent Mastoiditis. H. LUC. (*Presse Medicale*, 19th January 1921.)

Involvement of the mastoid antrum and cells may occur in the course of a middle-ear suppuration without producing any symptom or sign other than a discharge of pus so profuse and so resistant to treatment that it must clearly be derived from an area more extensive and more inaccessible than the walls of the middle ear alone. Two cases are quoted. In the first, a man of 30, operation was delayed, owing to the patient's reluctance, until it was made imperative seven weeks after the original paracentesis, by the sudden onset of rigors and high fever. The dura and lateral sinus were found healthy, but death ensued three days later from septicæmia. After this experience the author determined not to wait in such cases for more than four weeks, following the expiration of which full responsibility must be borne by the patient if he refuses operation.

The second case illustrates the importance of this principle. A male diabetic of 60 was operated on under local anæsthesia seven weeks after the onset of a profuse and persistent right-sided otorrhœa, the delay in operating being again due to the great reluctance of the patient to submit himself to an operation for an ailment which caused him no inconvenience or discomfort beyond that due to the abundant discharge of pus from his ear. The mastoid process was found to be completely disorganised. The lateral sinus was bathed in pus and covered with granulations. The discharge ceased on the second day after operation, and the wound had completely healed in twenty-six days. In each case the aditus was found to be exceptionally large.

F. J. CLEMINSON.

Case of Oriental Sore of Lobe of Ear. S. E. DORF. (*Proc. Roy. Soc. Med.*, Sect. of Dermatology, March 1921, p. 43.)

The patient, male, aged 20, developed a hard swelling in lobe of left ear, on board ship sailing from Aleppo. No history of insect bite or direct infection. When seen by exhibitor, there was an inflammatory

Abstracts

swelling of the lobe which was enlarged to twice its normal size, and was somewhat elastic as if it contained fluid, though none was present on puncture. Films obtained by puncturing showed large numbers of Leishman bodies. The skin over the tumour was red and slightly nodular in parts, but there was no ulceration. G. B. BRAND.

Otorrhœa in Tuberculous Subjects. ARMENGAUD. (Abstract from *Bulletin d'Oto Rhino Laryngologie*, Paris, March 1921.)

Attention is directed to the frequency of otorrhœa during the course of pulmonary tuberculosis. Tuberculous otitis presents difficulties in diagnosis, unless the lung condition is sufficiently advanced to be obvious. Statistics are quoted showing that in about 30 per cent. of autopsies on tuberculous subjects the patients had suffered from chronic otorrhœa, and of this 30 per cent. two-thirds, or 20 per cent., were demonstrably tuberculous. Four cases seen in military practice are described.

The author suggests the utility of always examining the lungs in the subjects of chronic and intractable otorrhœa. Examination of the aural discharge may reveal the tubercle bacillus.

E. WATSON WILLIAMS.

Three Cases of Secondary Otorrhœa. JORGEN MOLLER.
Acta Oto-Laryngologica, Vol. ii., fasc. 3.

The idea of a secondary or, as Itard calls it, "symptomatic" otorrhœa is one which is frequently met with in the older literature, but in the great majority of cases it was based upon a wrong conception of the pathology of the diseases in question, and was generally the result of a confusion of cause and effect. Among the very few genuine cases of this condition to be met with in the records is one which the author described in 1906, in which a non-otogenous otorrhœa was due to tuberculous osteitis above the ear. He now relates three additional cases.

In two of them a parotid abscess, and in the third a large suppurating traumatic hæmatoma of the parietal and temporal regions underwent spontaneous evacuation through the auditory meatus.

THOMAS GUTHRIE.

Mastoidectomy (Perisinus Abscess, Exposure of Dura) followed by Toxic Insanity. Recovery. OTTO GLOGAU. (*The Laryngoscope*, 1920, Vol. xxx., p. 566.)

The author refers to the toxic origin of insanity in certain cases, e.g., puerperal infection. The psycho-analyst, however, denies the importance of an underlying anatomic substratum for psychic processes.

Ear

He explains our actions by the struggle of suppressed wishes and fears. Only in specially susceptible subjects with pliable mental equilibrium will these toxic influences derange the normal psychic mechanism.

Case Report.—Male, aged 29 years, had severe pain in his right ear three months before his visit. After several days the ear discharged. The pain, however, grew worse. Four weeks before admission paracentesis was performed. The ear kept on discharging very freely, but pain grew worse, and the patient became very dizzy and weak. Examination showed the upper posterior canal wall sagging, redness and severe tenderness over the entire mastoid. An X-ray picture of both mastoids showed destruction of cells on the diseased side.

Operation.—Mastoid filled with pus and granulation tissue; dura of middle fossa exposed and found normal; an extensive perisinus abscess reached to the region of the bulb. Cavity was not closed. On the fifth day the patient appeared somewhat stuporous, pupils widely dilated. At night he became very talkative, and would not permit anybody to approach his bed. He claimed he saw a fly at the other end of the room which was the angel of death. He accused everyone of being a conspirator, and became very violent. Even after repeated hypodermic injections he had to be tied down. This condition continued for a week. He was restless and tore off the dressing. The relatives almost insisted upon an exploratory operation on the brain. Glogau, however, refused, claiming that he was dealing, not with a brain abscess, but with toxic insanity, which in due time would disappear. A neurologist reported left hemiparesis, mainly of the face. Tendon reflexes livelier on left side. Left adiadokokinesis. Left upper extremity showed ataxia and overpointing. There was thus a strong suspicion of temporo-sphenoidal abscess, but Glogau still refused to operate. Gradually the patient became more and more sensible, and was discharged about one month after admission.

Glogau thinks there had been a local œdema of the right temporo-sphenoidal lobe with general toxic manifestations in the course of septic disease. The hallucinations and delusions pointed to a psychic cause or rather susceptibility, founded on certain suppressed wishes and fears that occupied the patient's unconscious state previous to the operation.

J. S. FRASER.

Rupture of the Tympanum from Shell Explosions. CHAVANNE.
(*The Laryngoscope*, 1920, Vol. xxx., page 441.)

Chavanne reports on 543 cases, 74 cases involving both sides. Tympanic ruptures usually are more or less circular or linear. Order of frequency:—Below and in front, 258; below and behind, 45; in

Abstracts

front of the umbo, 62; above the umbo, 26; in front of the malleus handle, 23; behind, 39; in the postero-superior quadrant, 13; whole extent of lower half, 11; almost the entire tympanic membrane, 7; in the membrana flaccida, 4; whole anterior half, 1; posterior half, 8. Almost all the linear ruptures were vertical or slightly oblique. Mastoiditis is rare in these cases, 11 in 543. 35 out of 543 became chronic.

J. S. FRASER.

Primary Thrombosis of the Superior Petrosal Sinus. F. MÜLLER.
(*Zeitschr. f. Ohrenh.*, Bd. 79, H. 3 and 4, 1920.)

A boy aged 12 was taken ill four weeks previously with otitis media; swelling behind the right ear for two days.

Temperature 37° C., pulse 72; copious pus in right auditory meatus; drumhead reddened; auricle projecting; mastoid very tender; whisper heard at the ear. Operation, 6th Jan. 1916: Mastoid cells full of pus; extensive operation with opening of the antrum; lateral sinus appeared healthy. Same evening a rash similar to chicken-pox appeared all over the body. For several days the temperature was slightly above normal, and then subsided. On 11th Jan. temperature rose to 38.6° C; at midday he had a rigor and temperature 40° . Second operation: Jugular vein ligatured and divided; upper end bled and was ligatured. Lateral sinus was widely exposed, but wall appeared quite normal. The roof of the antrum was removed and an extradural abscess opened. The dura was covered with granulations; opened after painting with iodine, and incision made in temporal lobe. No abscess was found.

Temperature normal till 15th Jan., when it was slightly raised. On 17th Jan. rigor and temperature 39.7° . Immediate operation.

The jugular stump was opened again; the thrombus was removed till blood flowed, and the vein was again tied. The dura of the middle fossa was exposed more freely by removal of more bone. The junction of the superior petrosal sinus with the sigmoid sinus was exposed and pus found in the neighbourhood. The superior petrosal sinus was found to be full of breaking-down clot, which was removed. The subsequent recovery was uneventful.

The rash which appeared in this case was at first taken for chicken-pox, but was later labelled pemphigus septicus. The writer concludes as follows:—"A rash like chicken-pox in a surgical ear case must always awaken the suspicion of a septic or pyæmic infection or bacteræmia.

"One should, in extensive acute and chronic suppuration, regularly open the middle and posterior fossæ, even when the bone adjoining appears healthy." He recommends exposure of the junction of the two sinuses in all cases where rigors are not sufficiently accounted for by the findings.

J. K. MILNE DICKIE.

Peroral Endoscopy

Septic Thrombosis of the Sigmoid Sinus without Pyæmic Fever.

G. PIOLTI. (*Arch. Ital. di Otol.*, Vol. xxxi., No. 5, 1920.)

A peasant, aged 42, came complaining of pain in the left ear and side of the head of three months' duration. The pain had come on suddenly after a cold, and had been getting gradually worse. Examination showed slight reddening of the left drumhead, without any bulging. There was no sagging of the posterior wall of the meatus, and there was no rise of temperature. Paracentesis gave no pus, and the wound closed in two days. The pain continued to be very severe, so the mastoid was opened. The cortex was hard and sclerosed, and under it were found two large extradural abscesses, one in the middle and one in the posterior fossa. The lateral sinus was covered with granulations. It was opened and found to contain greyish yellow friable clot. This was carefully removed and the cavity packed. The subsequent course was uneventful, and resulted in cure. J. K. MILNE DICKIE.

PERORAL ENDOSCOPY.

Pulmonary Suppuration; Its Direct Treatment through the Bronchoscope.

B. M. KULLY. (*American Journal of Surgery*, March 1921.)

In spite of the recent rapid development of thoracic surgery, the percentage of cases of pulmonary suppuration considered suitable for surgical interference is very small, while the post-operative mortality varies from 35 to 40 per cent. The cases now described were treated *viâ* the bronchoscope by Dr Yankauer, or under his supervision, at the Mount Sinai Hospital.

Pulmonary suppuration, except in very acute cases, is always accompanied by bronchiectasis and gangrene. Any number of bronchiectatic cavities may be present. Owing to the overlapping of the various lobes the bronchoscope is a more reliable means of localising these foci of suppuration than are the Röntgen rays. In an analysis of 82 cases, the right lung was by far the most frequently affected, especially its lower lobe. Treatment consisted in regular irrigation and aspiration of the suppurating cavities. The bronchoscope is introduced into the cavity or into the bronchus leading to it, and, by means of Yankauer's double current canula, irrigation and aspiration are simultaneously carried out, the process being repeated with each lobe involved; 4-8 oz. of fluid are used for each irrigation, either normal saline or weak iodine being used. In the case of the latter, irrigation is commenced with a $\frac{1}{1000}$ solution and gradually increased to $\frac{1}{400}$. Cases with much foetid discharge are treated weekly, but as cough and expectoration diminish, the interval is increased to one or more months. Occasionally, as in ten of the cases dealt with, there is definite constriction or obstruction

Abstracts

of the draining bronchus. This may be due to inflammatory swelling of the mucous membrane, which can be overcome by the direct application of cocaine and adrenaline followed by argyrol. Obstruction may also be due to exuberant granulation tissue, which is treated with caustics after the application of cocaine, or to cicatricial contraction, which is overcome by means of bronchial dilators.

All the cases dealt with were in an advanced stage, and the author describes very encouraging results. Fœtor disappears, and there is a rapid diminution of cough and expectoration. Four of the patients were cured, one of these receiving over 100 irrigations. Nineteen cases were greatly improved, and were able to return to work. In three cases only was the improvement limited to loss of fœtor. Three patients died, not, however, as a result of the treatment. So far, 1054 injections have been carried out without a single untoward result. No discomfort accompanies the treatment; the patient is able to return home the same day and to start work next morning. Although some of the patients have been irrigated 150 times, there is no ill effect on the larynx and no hoarseness.

GILBERT CHUBB.

Röntgenographic Studies of Bronchiectasis and Lung Abscess after direct Injection of Bismuth Mixtures through the Bronchoscope.

H. L. LYNNAH and W. H. STEWARD. (*Annals of Surgery*, March 1921.)

The first injections of bismuth mixtures into the bronchial tree were accidental, and occurred in cases of œsophageal carcinoma, either with a fistula of the œsophagus into the trachea or with laryngeal palsy. No ill effects followed the occurrence. In 1917, Dr Yankauer treated a case of bronchiectasis by direct applications of iodine solutions through the bronchoscope, with complete recovery.

The authors describe five cases of lung abscess mapped out röntgenographically after injections of aqueous and oily mixtures of bismuth carbonate directly into the diseased area of the lung. A 7 mm. bronchoscope was introduced and each branch bronchus examined in turn, sucked dry of pus and the patient instructed to cough. By this means the branch from which the pus was coming could be definitely located and injected. No ill effects followed the injection; but, on the contrary, a decided improvement, with disappearance of odour and diminution of discharge.

Immediately after the injection, and before the patient coughed, the opaque mixture could be seen flowing out of the abscess cavity into the bronchial tree. The flow was upwards and the lower branches remained free, an observation which the authors suggest points to the existence of some other mechanism in addition to cough and cilia for the expulsion of secretions from the bronchial

Peroral Endoscopy

tree. The injections remained in the abscess cavity for from two weeks to two months. The material used consisted of 8 ccs. of bismuth carbonate in pure olive oil, in the proportions of one to two, sterilised by boiling and slowly injected.

For the purpose of locating the diseased area the röntgen examination should be made almost immediately after the removal of the bronchoscope, otherwise a fit of coughing will remove much of the bismuth from the involved lung. GILBERT CHUBB.

The Treatment of Severe Cicatricial Stenoses of the Œsophagus.

J. GUISEZ. (*Presse Medicale*, 26th June 1920.)

This paper deals with œsophageal strictures of traumatic origin, and is based on an experience of 135 cases, in nearly all of which the trouble was caused by swallowing caustic solutions. Six cases followed impaction of a foreign body, 5 were the result of gunshot wounds during the War, 2 were caused by poison gas, and 2 by the swallowing of hot fluid. In 44 of the cases the patient could not swallow any liquid, not even his saliva, and had undergone the operation of gastrostomy. The greater number of the cases, and even as many as 36 of those just mentioned, were amenable to treatment by endoscopic methods. Endoscopy revealed a tiny aperture surrounded by cicatricial tissue, usually near the periphery of the field of vision and hidden by a fold of mucous membrane. While liquids may pass this orifice, complete obstruction is readily induced by solid food, spasm, or slight inflammation. The stricture may be entered by a filiform bougie, and it is useful to leave the bougie in position for ten or twelve hours. The filiform instrument acts as a guide for a larger bougie, and in this manner 95 per cent. of strictures may be satisfactorily treated.

When the filiform bougie cannot be passed, gastrostomy should be performed. By this means complete rest is secured for the œsophagus, and after a few days it may be possible to pass a bougie under direct vision. Retrograde œsophagoscopy and dilatation of the stricture through the gastrostomy wound has never succeeded in the author's hands, and he regards it as useless, an opinion shared by Chevalier Jackson. In only 2 cases out of the total 135 was the œsophagus completely closed by cicatricial tissue.

DOUGLAS GUTHRIE.

Diverticula of the Œsophagus. ARTHUR DEAL BEVAN, M.D., Chicago, Ill., U.S.A. (*Jour. Amer. Med. Assoc.*, vol. lxxvi. No. 5, 29th January 1921.)

The author writes of his experience during the past ten years, and points out the value of X-ray examination. Reference is made to

Abstracts

the frequent failures in operative procedures where the diverticulum was excised, but in which leakage and sepsis ensued.

Pulsion diverticula occur at the junction of the œsophagus and the pharynx in the median line posteriorly. At this point there is a triangular area where the oblique muscles of the pharynx and the transverse circular muscle of the gullet meet.

Probably there is a congenital absence of some of the muscle fibres in this region, permitting a protrusion of mucosa during deglutition. The neck of the pouch always remains comparatively small, while the pouch itself may reach a size sufficient to hold eight or twelve ounces, or even more. Traction diverticula may occur at any point in the œsophagus, especially within the thorax, and are caused, as a rule, by cicatricial contraction of some old inflammation drawing the wall of the gullet outward and making a funnel-shaped diverticulum. Such cases are not of interest to the clinician apart from the primary lesion responsible for their production.

Small pulsion diverticula may produce few or no symptoms; with a little irritation in swallowing and occasional regurgitation, but no great discomfort to the patient, they do not call for any treatment. Bevan points out, however, the ease with which these early cases may be cured. Larger sacs, however, may produce very great discomfort from decomposition of the contents and annoying regurgitation. In others the difficulty of swallowing becomes increased, and in extreme cases, where most of the food passes into the sac, starvation may have to be faced. The author has had cases where gastrostomy was necessary in order to feed the patient until he regained sufficient strength for further operative measures.

The method of operation depends upon the size of the sac. If it is small, it is invaginated with three purse-string sutures into the œsophagus where it can do no harm. Larger and longer sacs should not be so treated owing to the danger of their closing the opening of the larynx in vomiting.

With larger sacs two methods are available, viz: (1) Invagination of one half of the diverticulum into the other half with three purse-string sutures. The remainder of the sac is then obliterated by six or eight longitudinal sutures running parallel with its long axis: (2) crushing the main mass with heavy forceps, tying with a silk ligature and cutting off the distal portion with a cautery. The remainder of the sac is then treated by invagination as is advised for small diverticula.

The anatomy of the region and the various steps of the operation are illustrated by drawings which greatly simplify the description of the operative technique.

PERRY GOLDSMITH.

Miscellaneous

MISCELLANEOUS.

Some Results of Light Treatment in Tuberculosis of the Mouth, Pharynx, Larynx, and Nose. V. MALMSTRÖM. (*Acta Otolaryngologica*, Vol. ii., fasc. 3.)

The cases described were treated simultaneously by light baths and ordinary sanatorium methods. Both sunlight and a modification of the Quartz Mercury vapour lamp ("Hohensonne"), with an alternating current of 110 volts, were employed. The duration of the sun baths was one hour daily when weather conditions permitted, and of the artificial light baths forty-five to sixty minutes at a distance of 1 metre from the lamp. The whole of the naked body was exposed to the source of light and not merely the tuberculous focus. No local medical or surgical treatment was carried out.

The seven cases recorded suffered from tuberculous ulcers of the tongue, palate, pharynx, larynx, and nasal cavities. Some of them also had advanced pulmonary disease. The lesions in the mouth, nose, and throat in all the cases became healed notwithstanding the fact that in some of them the pulmonary disease actually progressed.

While recognising the impossibility of determining with certainty the parts played respectively by the light and the general hygienic and dietetic treatment, the author is nevertheless convinced that the former is a powerful therapeutic factor in tuberculosis.

THOMAS GUTHRIE.

Plastic Operations on the Face by Means of Fat Grafts. J. N. ROY. (*Laryngoscope*, February 1921.)

Roy describes this method of filling up cicatricial depressions following injury. After excising the cicatrix and freeing the surrounding skin, a piece of fat from the thigh or buttock is transplanted into the wound. Obviously the method is not applicable to bony defects, but is ideal for the soft parts. Four cases are described, and the paper is illustrated by a series of photographs.

ANDREW CAMPBELL.

REVIEW OF BOOK

Collection of Lantern Slides Demonstrating the Surgical Anatomy of the Temporal Bone, with Photographs, Catalogue and Guide.

ARTHUR H. CHEATLE, F.R.C.S. London: H. K. Lewis & Co., Ltd. 1921.

There are probably few students of otology who are unacquainted with Mr Arthur Cheatle's valuable investigations upon the anatomy of the temporal bone. There must be many, however, who have neither

General Notes

the opportunity nor the means of making a visit to the Museum of the Royal College of Surgeons of England, where Mr Cheatle's collection of temporal bones is displayed and where the actual specimens can be studied with the aid of a descriptive catalogue.

In order to make the fruits of his work more accessible, the most important and typical of the preparations—some 200 in number—have been photographed stereoscopically and a series of lantern slides has been prepared from them. The latter should prove extremely useful to those who are engaged in teaching the anatomy and surgery of the Ear, while the album of photographs with catalogue and guide should be a valuable source of reference to the surgeon.

The photographs and lantern slides, which have have been prepared by Messrs Hinton & Co., 38 Bedford Street, Strand, W.C., 2, have been well executed under Mr Cheatle's personal supervision.

A. LOGAN TURNER.

GENERAL NOTES

H.M. The King has been graciously pleased to confer the Order of Companion of the British Empire upon Dr Holger Mygind, Copenhagen, in recognition of the services which he rendered to the British Red Cross during the War and to the British Government during the period of repatriation of the prisoners of war.

* * *

CENTRAL LONDON THROAT AND EAR HOSPITAL.

Lantern Demonstration.

On 4th May last Mr Arthur Cheatle gave a Lantern Demonstration on "The Cellular Development in the Temporal Bone," as the introductory lecture of the Summer Session of Classes at the Hospital.

The lecture was well attended, and Mr Cheatle's clear and practical description of the many lantern slides illustrating his work was followed with great interest.

We believe that his collection of slides and photographs is now obtainable from Messrs Hinton & Co., 38 Bedford Street, W.C., 2.

* * *

TENTH INTERNATIONAL CONGRESS OF OTOLOGY.

There has been no International Congress of Otology since the meeting in Boston in 1912. We are therefore glad to hear that the Tenth Congress will be held in Paris from the 26th to the 30th July of next year. Prof. Pierre Sébilleau of the Lariboisière Hospital is the President; Dr A. Hautant is the Secretary General; and Dr Georges Laurens will act as Treasurer. An influential Committee, elected at

General Notes

Boston in 1912, is acting on behalf of the Organising Committee for Great Britain and Ireland.

The first meeting of the Committee of Organisation for Great Britain and Ireland was held on 18th July at 64 Wimpole Street. There were present—Professor Urban Pritchard, Sir Charles Ballance, Sir James Dundas-Grant, Mr Arthur Cheatle, Mr Nourse, and the Convener, Sir St Clair Thomson, appointed by the Paris Committee.

The President and the President-Elect of the Section of Otology of the Royal Society of Medicine—Sir Charles Ballance and Dr A. Logan Turner—were co-opted by the Committee. Three communications from Paris were read, giving the titles of the subjects selected for general discussion, and inviting Sir St Clair Thomson to be one of the *rapporteurs*. The invitation had been regretfully declined.

The following were elected office-bearers of the British Committee of Organisation: President, Professor Urban Pritchard; Chairman of Committee, Sir St Clair Thomson; Hon. Secretaries, Mr Lionel Colledge and Mr J. S. Fraser. It was decided to invite the members of the Section of Otology of the Royal Society of Medicine and of the Scottish Otological and Laryngological Society to join the British Committee, the subscription for members being fixed at ten shillings. Those who joined the Committee would be kept informed of the arrangements connected with the Congress.

* * *

COMPLIMENTARY DINNER TO SIR CHARLES BALLANCE, K.C.M.G., C.B.

On the evening of Tuesday, 12th July, Sir Charles Ballance, President of the Section of Otology, Royal Society of Medicine, was entertained by the Medical Staff of the Throat Hospital, Golden Square. The dinner took place at the Ritz Hotel. Mr T. Jefferson Faulder, the senior member of the hospital staff, occupied the chair. Amongst the guests invited to meet Sir Charles Ballance were Sir Anthony Bowlby, K.C.B., President of the Royal College of Surgeons of England; Dr Jobson Horne, President of the Section of Laryngology; Sir John MacAlister, Secretary, Royal Society of Medicine; Dr H. S. Birkett, C.B., Dean of the Faculty of Medicine, M'Gill University, Montreal; Sir James Dundas-Grant, K.B.E.; Sir St Clair Thomson, Sir Cuthbert Wallace, K.C.M.G.; Mr Arthur H. Cheatle, C.B.E.; Dr William Hill, Mr W. G. Howarth, Mr Hunter Tod, Dr Lakin, Mr Layton, D.S.O.: Dr Dan M'Kenzie, Mr Marriage, Mr Herbert Tilley, and Mr E. B. Waggett, D.S.O. The toast, "Sir Charles Ballance and Guests," was proposed from the Chair in felicitous terms, and was responded to by Sir St Clair Thomson and Sir James Dundas-Grant, who dwelt upon the valuable work done by Sir Charles in the interests of British Otology.

General Notes

THE BRITISH MEDICAL ASSOCIATION, NEWCASTLE-UPON-TYNE.

The Section of Laryngology and Otology met, under the Presidency of Dr William Hill, on the 20th and 21st July. Although the attendance was not so large as frequently was the case at pre-war sessions, what was lacking in numbers was amply compensated for by the interest taken in the business of the Section and by the quality of the papers and discussions. Sir Charles Ballance, K.C.M.G., in presenting the problems connected with the Early Diagnosis and Treatment of Otitic Meningitis, drew upon his large experience, and, in graphic terms, described the various clinical types of the disease. The paper gave rise to considerable discussion in which a number of the members took part. The vexed question of Ossiculectomy was brought before the notice of the Section by Sir James Dundas-Grant, in a paper which dealt with the indications for this line of treatment, while Ionization in the Treatment of Suppuration in the Nasal Sinuses and Middle-Ear Cleft was presented by two of its advocates, Dr A. R. Friel and Dr Salisbury-Sharpe.

On the second day of the Meeting, the members devoted their attention to the subject of Hæmorrhage following Operations upon the Tonsils. The question was dealt with from various aspects and an animated discussion took place. Predisposition and prophylactic measures were considered by Mr O'Malley, and statistical records of serious and fatal hæmorrhage were brought forward by Dr A. Brown Kelly. The rôle of the anæsthetist, an important functionary in such operations, was in the hands of Mr G. A. H. Barton, while the influence of operative technic in preventing or favouring serious hæmorrhage was entrusted to Mr Herbert Tilley, Mr Musgrave Woodman, and Mr Sydney Scott. Methods of arrest were discussed by Drs Irwin Moore, Dan M'Kenzie, and T. H. Just, the last-named dealing also with the handling of the patient suffering from collapse. The concluding contribution to the discussion was made by Lieut.-Colonel John Kynaston, who raised the question of unnecessary operations and alternative methods of treating tonsils and adenoids.

* * *

We regret to have to record the death of Dr J. Walker Downie, Glasgow, which occurred on 21st July at his residence, Cragmohr, Shandon, Dumbartonshire. We hope to publish a notice of his career in an early number of the *Journal*.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

IS THE MERE ENLARGEMENT OF A TONSIL
GOOD AND SUFFICIENT REASON FOR ITS
ENUCLEATION? *

By T. MARK HOVELL, F.R.C.S.E.

DURING the last few years the practice has sprung up of systematically enucleating all tonsils which are enlarged, irrespective of the cause of the enlargement, and the practice has become so general that when the projecting portion has been merely sliced off to restore the inner surface of the tonsils to its former position, flush with, or slightly external to, the pillars of the fauces, some throat specialists have no hesitation in saying that the operation has been improperly performed, thus implying ignorance or incompetency on the part of the operator.

It must be remembered, however, that all enlarged tonsils are not diseased, enlargement, especially in children, being a very usual result of nasal obstruction and therefore commonly associated with adenoid growths in the naso-pharynx. That nasal obstruction is the cause, is shown by the tonsillar tissue contracting when free nasal respiration has been restored. In these cases, therefore, which form the large majority in children, merely removing the portion of the tonsil which projects beyond the pillars of the fauces when the tonsillotome is pressed firmly outwards whilst firm counter pressure is made externally, is all that is necessary. It is a simple and safe operation, the hæmorrhage being slight and stopping in a few minutes,

* Paper read at the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, 2nd June 1921.

T. Mark Hovell

especially if the cheek and side of the face are sponged with iced water.

From my personal experience, which may be called large, I have known but few tonsils sliced in this manner with the guillotine which bled to an extent which required special treatment, and in all of them the bleeding was easily stopped by the method which I introduced many years ago, viz., rubbing the bleeding surface with a mixture of one part of gallic acid with two parts of tannic acid, while a hand was placed outside the tonsillar region to make counter pressure to the rubbing. For many years I have kept this mixture in balls the size of a marble for such use should occasion require.

I have been long enough in practice to see the results of this simple treatment of enlarged tonsils, and I have been repeatedly told by parents bringing their children for nasal obstruction or other ailments, that they themselves have had no trouble with their throat since I operated on them years ago.

Recently, a gentleman on entering my room, remarked that I would not remember him, but I cut his tonsils thirty-four years ago when he was a lad of sixteen. There had been no further trouble with his throat until the last few weeks, so he looked up my address in the directory.

Last week I saw a lady aged thirty-five, whom I had not seen since I operated upon her for adenoids and enlarged tonsils when she was eighteen years old. She told me that her throat had been quite well since. There is now a deep sulcus in the tonsillar region.

When there has been a discussion on the relative advantages or drawbacks of tonsillotomy or tonsillectomy, it has often been stated as an argument in favour of the latter that after tonsillotomy the tonsils frequently become again enlarged. This was my experience many years ago before I discovered the necessity for removing the posterior extremity of each inferior turbinated body when enlarged, as the last stage of the operation for the removal of adenoid growths in the naso-pharynx, because otherwise free nasal respiration is not obtained. Enlargement of the tonsils, therefore, following tonsillotomy is in very many cases not due to the operation, but to the persistence of nasal obstruction due to the neglect to remove a cause of its production. The same cause is often responsible for the recurrence of adenoid growths.

I have for many years drawn attention to this very necessary

Reason for Enucleation of Tonsil

detail in connection with the operation for the removal of adenoid growths in the naso-pharynx, and I know that there are now many operators who confirm my opinion and systematically adopt the procedure. If the posterior extremities are not enlarged no harm has been done by passing a snare through the nostrils, which is the best way to determine whether or not there is lax tissue which should be removed.

Another cause of nasal obstruction persisting or recurring after the operation for adenoid growths at which the tonsils may have been removed, is the haste with which the operation was performed. This occurs when nitrous oxide gas or another anæsthetic is used which lasts only a short time, or with the cases in which no anæsthetic is given. Portions of growth are often left when the operation is thus performed, and in these cases no attempt is made to ascertain the condition of each posterior extremity of the inferior turbinated body. For the snare to be passed properly the soft palate must be completely relaxed.

In some cases in which the nasal obstruction is of long duration the habit of mouth breathing must not be overlooked. Breathing exercises are useful for these patients.

Another statement made against the practice of tonsillotomy is that the edges of the sliced crypts are apt to unite and cause retention of secretion. This result in my experience is rare, and when it occurs is easily remedied by breaking down or removing the inner wall of the crypt which obviously is superficial.

I will now turn to tonsillectomy. In my opinion this operation should be performed only for diseased tonsils, or for a condition which cannot be cured unless the tonsil is removed, such as a chronic peri-tonsillar abscess. The commonest condition necessitating this operation is recurrent attacks of tonsillitis due to septic material in the crypts.

As far as my memory serves me, the subject of removing more of the tonsil when diseased than could readily be done by the ordinary guillotine, was first introduced at the Meeting of the British Medical Association at Cheltenham, in 1901, when I was President of the Laryngological and Otological Sections. Dr Pegler at that Meeting read a paper advocating the use of Hartmann's Conchotome, and Mr Tilley in the discussion which ensued said that he frequently disengaged the tonsils to the required amount with a finger. Since then tonsillectomy has

T. Mark Hovell

become more generally practised, and it will be within the recollection of many who are here to-day that at the Laryngological Congress at the Imperial Institute in 1913, a foreign visitor stated that he thought the time had come when the treatment of enlarged tonsils should be taken out of the hands of the general practitioner and be made an operation for specialists.

Enucleation of the tonsils is now so frequently done by specialists that many general practitioners, although disapproving of this operation for tonsils which are merely enlarged, feel compelled to do the operation because the public have been led to believe that it is the only sound treatment, and that merely removing the projecting portion is an antiquated method and does not give satisfactory results.

If enucleation of the tonsils was a simple operation and free from risk and was not often followed by permanent injury to the patients, the matter would be of less importance. I have recently seen two ladies who had good voices before their tonsils were enucleated, but since the operation they have been unable to sing, the altered position and limited movements of the soft palate due to cicatrisation being the cause. You will readily understand that such a result was inevitable, when I tell you that the operator in the worse case was a prominent member of this Section.

With this result in adults what must be the effect on the future singing voice when the operation is done to children? I have seen many children with a considerable amount of cicatrisation around the tonsillar region and contiguous portion of the soft palate as a result of tonsillectomy. As you all know it is a common practice to stitch the pillars of the fauces together to arrest hæmorrhage, and some operators have gone so far as to recommend that this should be done always as a precautionary measure against hæmorrhage recurring, although obviously the result of this procedure must be to curtail the movements of the soft palate.

It has often been stated that the hæmorrhage which follows tonsillectomy is of but little consequence, but possibly opinions differ as to what is considered a serious extent. Rather more than a year ago I heard from a creditable source that a throat specialist had then had four deaths from hæmorrhage following enucleation of the tonsils, but since then I have not been in a position to hear of his more recent contributions to the

Reason for Enucleation of Tonsil

cemetery. As regards the members of this Section, I will not refer to deaths but will merely mention that to my knowledge there is more than one of them who, following enucleation of the tonsils, has been confronted with hæmorrhage to a degree which caused him grave anxiety.

Have we not a duty to our patients, and does not that duty comprise restoring them to health without exposing them to unnecessary risk? The frequency with which hæmorrhage occurs to a serious degree following tonsillectomy is shown by the numerous instruments which have recently been devised for checking it, to say nothing of the discussions which have taken place on the subject.

This is not the time to point out and enumerate the functions of the tonsils, but it is certain that they were not created merely to form tissue for a surgeon to remove. At the Laryngological Congress in 1913, Professor H. Burger (Amsterdam) said, "The profession was not fully informed as to the physiological function of the tonsils; therefore was it right to systematically remove them in children? He was gaining the impression that laryngologists claimed to be wiser than God Almighty."

In conclusion it is my opinion that enucleation of the tonsils as a routine method for mere enlargement is unjustifiable,

(1) Because very many cases of enlargement of the tonsils are the result of nasal obstruction, as is shown by their shrinkage when a free nasal air-way has been obtained, especially when the new formation has been removed so as to restore the inner surface of the tonsil to its former position, flush with, or slightly external to, the pillars of the fauces.

(2) Because of the large number of deaths which have occurred from hæmorrhage following enucleation of the tonsils, and the still larger number of cases in which hæmorrhage following the operation has been so severe that it has caused the gravest anxiety to the patients' relatives and even to the surgeon himself.

(3) Because the cicatrization which often follows has its effect on the singing voice of adults, and in the case of children probably may prevent a good singing voice in the future.

INTRINSIC CANCER OF THE LARYNX: USUAL SITE OF ORIGIN, AS DEMONSTRATED AT FIFTY LARYNGO - FISSURES, AND ITS INFLUENCE ON DIAGNOSIS, PROGNOSIS, AND TREATMENT.*

By SIR ST CLAIR THOMSON.

THE text-books of Morell Mackenzie (1880) and Lennox Browne (1899) both expressed the view that the ventricular bands were the site of origin in a majority of cases. This was corrected by Semon (1896) who demonstrated that the vocal cord was the part attacked in the very large majority of cases. But Semon followed Virchow's teaching that malignant growths showed a preference for the posterior part of the vocal cord. The author gives the results of 50 cases in which the site of origin was not only viewed in the laryngeal mirror but directly inspected during a laryngo-fissure. The disease was limited to the anterior third of the cord in 3 cases; to the middle third in 7 cases; and in not one single case was it limited to the posterior third. In 16 cases the anterior and middle thirds were invaded; in 3 cases the middle and posterior thirds; and in 21 cases the whole cord was attacked. In addition, he points out that the subglottic region, and its anterior third, was in 13 cases either the original site of disease, or was invaded by extension. He arrives at the following conclusions:—

Conclusions as regards Usual Site of Origin.—1. Intrinsic cancer of the larynx originates on the vocal cords or in the subglottic area.

2. In 50 cases carefully examined both indirectly with the mirror and by direct examination after splitting the larynx, it has never been found in the posterior commissure (interarytenoid region), nor originating from the ventricular bands or the ventricle of Morgagni.

3. A malignant growth may originate on any part of the cord, but is more common in the central portion or anterior half than in the posterior area of the larynx.

4. As is now well known, an epithelioma originating in this

* Epitome of a Paper read before the Summer Meeting of the Section of Laryngology, Royal Society of Medicine, on 2nd June 1921, and published in the *British Medical Journal*, 25th June 1921.

Intrinsic Cancer of the Larynx

region remains for a long time limited to the cord affected and the adjoining side of the larynx, but it may cross the anterior commissure, and, in later stages, it invades the arytenoid and the area to the outer side of it.

5. The inner surface of the cord may be affected primarily or by extension. The subglottic area may be invaded by a growth originating in the cord. But a cancer may also start below the level of the cords, in the subglottic area.

6. A subglottic cancer is much more common in the anterior than in the posterior half of the larynx.

Conclusions as regards Prognosis.—1. The superficial or projecting tumours of limited extent are the most favourable.

2. Those situated in the middle third or anterior half of the cord are more promising than those invading the anterior commissure in front, or the arytenoid region behind.

3. Growths embedded in the cord, or extending into it below an intact mucosa, are not so favourable.

4. An epithelioma extending along the inner margin of the cord is still less favourable.

5. Subglottic cancers are very unpromising as regards lasting cure by laryngo-fissure. They are frequently associated with impaired mobility or complete fixation of the cord.

Conclusions as regards Operation.—1. In every case, however limited the growth, the entire vocal cord should be excised from the anterior commissure up to and including the vocal process of the arytenoid.

2. The growth, with as wide a margin as possible of apparently healthy tissue all round it, should be removed in one mass: the incision should therefore go down to the lower edge of the subglottic area, above, it should pass through the healthy ventricular band above, and externally it must include the perichondrium lining the thyroid ala.

3. To facilitate this, the thyroid ala should be removed so that a laryngo-fissure is, really, a partial hemi-laryngectomy.

POSTERIOR ETHMOIDAL CELL EXPLORATION.

By PATRICK WATSON-WILLIAMS, M.D. London, Lecturer and Examiner in Otology, Rhinology, and Laryngology at the University of Bristol; Cons. Surgeon for Diseases of the Ear, Nose, and Throat, Bristol Royal Infirmary; and
ERIC WATSON-WILLIAMS, M.C., M.B. Cantab., Surgeon for Ear, Nose, and Throat Diseases, Southmead Infirmary; Registrar to the Department, Bristol Royal Infirmary; Surgeon for Ear, Nose, and Throat, Bath War Pensions Hospital.

INFECTIVE ethmoiditis is often found in association with other nasal sinus infections, but the implicated area may be confined to the ethmoidal labyrinth and even to one or two cells, either of the anterior or posterior group. It is common knowledge that the anterior ethmoidal cells are usually involved with antral suppuration and frontal sinusitis, while the posterior ethmoidal cells frequently become infected in cases of sphenoidal sinusitis.

Now involvement of the anterior ethmoidal cell group is not difficult either to diagnose or to treat, and by excluding a possible infection of the corresponding frontal or antral sinuses, the relatively simple exenteration of the anterior cells may be relied on to remove the source of the trouble.

The posterior cells, on the other hand, are inaccessible to direct inspection, and discharges from these cells, escaping beneath the superior turbinal towards the speno-ethmoidal fissure, cannot usually be differentiated from sphenoidal sinus discharge otherwise than by some direct method of exploration. The method we follow for the diagnostic exploration of the posterior ethmoidal cells is similar to that for exploring the sphenoidal sinuses introduced by one of us (P. W. W.), many years ago. Together with short notes of a few of our cases it may be of some practical interest to describe briefly our technique, as we can find no description of any exact method of exploration in current literature or text-books.

TECHNIQUE.

Anæsthesia.—Local anæsthesia suffices for all but nervous adults and children, and the position of the patient being the same whether local or general anæsthesia be employed, we propose to describe the procedure when local anæsthesia is used. The nasal passage having been cleansed and the vestibule

Posterior Ethmoidal Cell Exploration

disinfected with iodine, a 20 per cent. solution of cocaine is sprayed in the nose rendering the parts almost insensitive, and by causing the turbinal bodies and mucosa to shrink, this affords a readier inspection and approach. The patient then lying flat on the back, with a good illumination, a frontal sinus cotton-wool carrier dipped in solid cocaine hydrochlorate crystals is carried well up and back into the middle or superior meatus according to the route chosen, and in the space of three or four minutes the patient is ready for the exploratory procedure.

We use the sphenoidal sinus blunt trocar and cannula, and the suction syringe. The posterior ethmoidal cells may be entered through the anterior wall either by the middle or superior meatal route, or by puncture of the internal walls in the olfactory fissure. The latter was the route originally employed, but often proved impossible; then the superior meatal route was utilised, but this likewise is often less easy of access than the middle meatal approach which we adopt in the majority of cases. The trocar and cannula are passed into the top of the middle meatus, between the ethmoidal bulla and the middle turbinal (or sometimes through the bulla), and slipped upwards and backwards until the point rests high up on the posterior oblique attachment of the middle turbinal. Just before puncturing the cell-wall the direction of the trocar and cannula is rendered less oblique by raising the instrument, and if necessary the tip of the nose, and it is now made to take a distinctly outward direction. The instrument is then gently pressed through the thin anterior wall of the posterior ethmoidal cell or cells, so as to enter the posterior cell just outside the thicker bone which corresponds with the attachment of the middle turbinate bone. One should take care not to fracture the outer wall (into the back of the orbit), nor to direct the point too much upwards through the roof into the cranium. If this route is followed, and the pressure made somewhat *outwards* and but slightly upwards, there should be no risk of accident in skilled hands. When the point has fully entered the cell, the cannula is held steadily *in situ*, while the trocar is withdrawn and the suction syringe, containing about 3 c.c. of sterile distilled water, is attached. A slight movement of the piston to and fro serves to wash the water into the sinus and suck it back—it may not go quite so easily as with the sphenoidal sinus, probably from a difference in the size of the cell's natural ostium which serves as a bung-hole. The specimen

Patrick and Eric Watson-Williams

thus withdrawn from the cell is now examined macroscopically and transferred to a sterile bottle, labelled, and reserved for macroscopic and cultural examination, and the operation can be completed, if desired, by injecting a little colloidal silver or 1/10,000 biniodide of mercury, leaving some of it in the cell.

If the route through the superior meatus be adopted, when the conformation of the middle turbinal facilitates this approach or renders it desirable, the point for entry corresponds to that by the middle meatal route but immediately *above* the posterior attachment of the middle turbinal, and a similar manœuvre followed. A marked inward bulging of the anterior half of the middle turbinal makes access to the superior meatus more difficult and sometimes impossible, and, moreover, there is perhaps a greater risk of allowing the point to be directed too much upwards towards the roof of the cell or olfactory fissure. However, if due care be taken, the entry to the cells by this method is more direct and sometimes even easier than by the middle meatal route.

Certain precautions to observe have been noted above, but in practice we find that one is considerably aided by exploring the sphenoidal sinus first and so obtaining the measurements, say from the tip of the patient's nose to the anterior and to the posterior sphenoidal sinus walls respectively.

With a small sphenoidal sinus the posterior ethmoidal cell is frequently larger and deeper than in patients with a well-developed sphenoidal sinus, but the entry to a posterior ethmoidal cell is well anterior to the anterior sphenoidal sinus wall, while the posterior wall but rarely extends back so deep as the posterior wall of the sphenoidal sinus. The hand that has been accustomed to the method of entering and exploring a sphenoidal sinus is trained to the feeling of entry to an ethmoidal cell.

We have never met with any accident from exploration of the posterior ethmoidal cell, and if the direction indicated in the diagrams be followed and all forceful manipulation avoided we do not think any misfortune can result (Figs. 1 and 2).

When one is in doubt whether the cannula has entered the posterior ethmoidal cell or the sphenoidal sinus (as may well be when the ethmoid cells extend backwards beyond the anterior sphenoidal sinus wall), the question is easily settled by passing another cannula into the sphenoidal sinus also, applying the

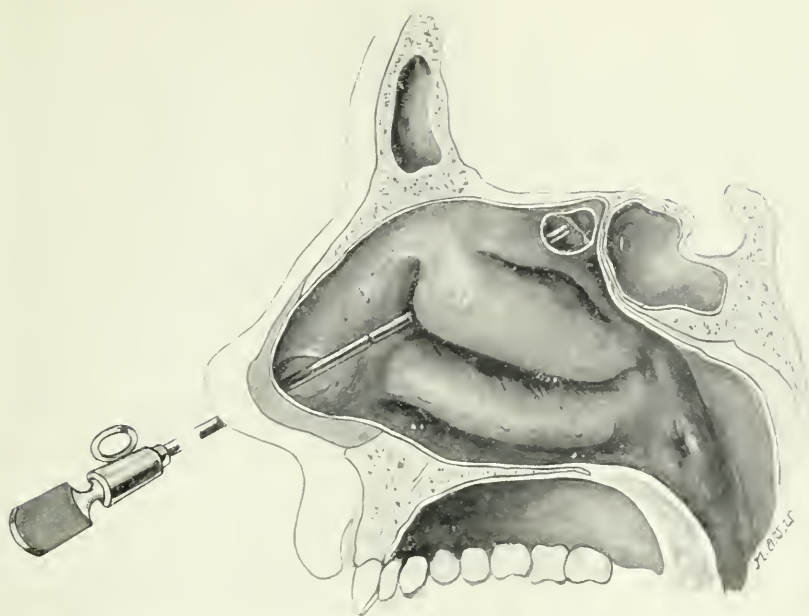


FIG. 1.—Graduated Trocar and Cannula introduced through the middle meatal route.

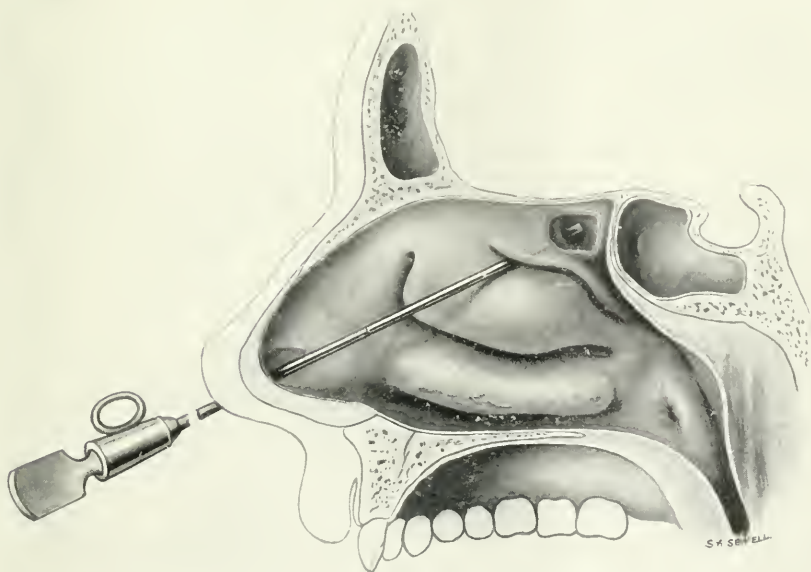


FIG. 2.—Graduated Trocar and Cannula introduced through the superior meatal route.

Posterior Ethmoidal Cell Exploration

syringe and injecting distilled water: if both cannulæ have entered the same cell then the water injected through one escapes through the proximal end of the other.

We occasionally find it too difficult to enter and to feel sure of having entered a posterior ethmoidal cell in the manner described. Anatomical or other conditions may render it difficult to enter a posterior ethmoidal cell, in which case one should desist in attempting exploration rather than expose the patient to risk from using force.

The exploration of these ethmoidal cells being called for usually when the sphenoidal sinus is not wholly accountable for the symptoms of infection in the posterior group of the accessory sinuses, it is most commonly done in conjunction with the exploration of sphenoidal sinuses. Exploration of the posterior ethmoidal cells of both sides need not occupy altogether more than five minutes after anæsthetisation, and may be done in half that time under a general anæsthetic.

ILLUSTRATIVE CASES.

F. W., girl, aged 9 years (Case No. 1, Table A). For six or eight months she had been suffering from severe frontal headaches, sometimes also occipital, the voice getting thick and nasal, with recurring sore throats and frequent "colds," and more or less constant nasal muco-purulent discharge, most noticeable from the left nasal passage. Tonsils and adenoids had been removed by Dr Paterson of Cardiff four years previously; adenoids had not recurred. It was thought that the child had latent sinusitis, probably antral. Under general anæsthesia the sinuses were explored by the suction syringe. Both maxillary antra proving quite clear, it was thought that the sphenoidal sinuses would reveal the source of discharge and they were therefore explored. But as they also proved normal, one was driven to explore the posterior ethmoidal cells, although in so young a patient we avoid entering the ill-developed posterior ethmoidal labyrinth. Both sides yielded turbid fluid; therefore the cavities were opened, all the ethmoidal cells being freely clipped.

Measurement: Nose tip to back wall of sphenoidal sinuses	3 inches
Measurement: Nose tip to back wall of posterior ethmoidal cells	2 $\frac{7}{8}$ "

Patrick and Eric Watson-Williams

Bacteriological findings (reported by Professor Scholberg):—

The maxillary antra and sphenoidal sinuses yielded nothing of import on film staining and the culture in every case sterile.

R. Posterior Ethmoidal Cell—

Film: A few polymorphs.

Plates: Colonies of streptococcus and staphylococcus.

L. Posterior Ethmoidal Cell—

Film: A few pus cells and very few red cells.

Plates: A few colonies of streptococci.

The child made a good recovery and lost the headaches, and the discharge diminished.

It appears certain that the infection was limited to the ethmoidal labyrinth, hence the necessity for opening up the ethmoidal cells.

It is obvious that in the majority of nasal sinusitis cases the exploration of the posterior ethmoidal cells is of no clinical importance, while in other patients the presence of pus and oedematous granulations or polypus in the region of the posterior cell group may obviously demand the opening up and drainage of the cells, and in such cases operation rather than mere exploration is called for. Yet in certain cases it is highly desirable to have at one's disposal, a method whereby the definite diagnosis of ethmoidal cell infection may be determined. The more accurately we localise the sources of an infective nasal discharge, the less the mutilation required to eliminate the focal infection. Operations on the nasal sinuses are sometimes rendered unsuccessful from failure to recognise involvement of some sinus unintentionally left unopened, and when, perhaps, one or more ethmoidal cells have kept up a disappointing discharge, it is helpful to be able to localise the source of continued infection.

Occasionally an ethmoidal sinus infection is the cause of a retro-bulbar neuritis, and it then becomes a matter of grave concern to be able to localise the infective area; and, as in such cases the discharge may be macroscopically non-purulent, it may be a very difficult problem to find the precise area of infectivity by inspection unless one resorts to exploration and bacteriological investigation.

The purport of our communication is simply to demonstrate our method of *exploring* the posterior ethmoidal cells, and

Posterior Ethmoidal Cell Exploration

we have therefore avoided citing more than these four examples, the two first being operations by P. W.-W., the others by E. W.-W. They suffice, however, to bring out the fact that such exploration may yield negative results, macroscopically and sterile on culture, whilst in other cases with the presence of pus proves infective on bacteriological examination, the exploration may be of positive value. As the exploration almost invariably included the maxillary antra and sphenoidal sinuses as well as the posterior ethmoidal cells, the film and cultural findings for each sinus is of interest for comparison. In all cases the bacteriological investigations were made by the pathologists named.

TABLE A.

Sex.	Age.	Symptoms.	Antra.	Sphen. Sinuses.	Post-Ethmoid Cells.
F.	9	Headaches, nasal catarrh, etc.	R. <i>Film</i> O. <i>Cult</i> O. L. <i>Film</i> O. <i>Cult</i> O.	R. & L. communicating <i>Film</i> O. <i>Cult</i> O.	R. <i>Film</i> Polymorphs. <i>Cult</i> Strept. Staph. L. <i>Film</i> Pus cells. <i>Cult</i> Strept.
Pathologist—Professor SCHOLBERG.					
F.	30	Recurrent rhinitis, sore throats, loss of voice, neurasthenia.	R. <i>Film</i> Pus. G.P. Cocci. <i>Cult</i> Staph.	R. & L. communicating <i>Film</i> No cells. <i>Cult</i> Sterile	L. No pus. <i>Film</i> Strept. Staph. <i>Cult</i> Strept. of the salivarius type, non-hemolytic Staph.
Pathologist—I. W. K. MOUATT.					
F.	42	Headache, rhinitis, cacosmia.	R. <i>Film</i> M. pus. <i>Cult</i> Strep. bac. L. <i>Film</i> O. <i>Cult</i> O.	R. <i>Film</i> O. <i>Cult</i> O. L. <i>Film</i> O. <i>Cult</i> Staph.	R. <i>Film</i> Polyn. <i>Cult</i> Strept. L. <i>Film</i> O. <i>Cult</i> Prot.
Pathologist—Professor WALKER HALL.					
M.	21	Chr. laryngitis, sinusitis.	R. <i>Film</i> O. <i>Cult</i> O. L. <i>Film</i> Mucus. <i>Cult</i> Staph. P. Aur.	R. <i>Film</i> O. <i>Cult</i> O. L. <i>Film</i> O. <i>Cult</i> O.	R. <i>Film</i> Mucus. <i>Cult</i> Pneumococcus. L. <i>Film</i> Debris. <i>Cult</i> Staph. P. Aur.
Pathologist—Dr P. ELLISON.					

Patrick and Eric Watson-Williams

A few examples showing the measurements in adults and in children may be usefully added here.

TABLE B.

Measurements in inches from Nose Tip to Back Wall.

Sex.	Age.	Sphenoidal Sinus.	Post-Ethmoid Cell.
		Inches.	Inches.
M.	55	$4\frac{1}{16}$	$3\frac{1}{8}$
M.	38	{ $R. 3\frac{7}{8}$ $L. 4\frac{1}{16}$	$R. 3$ $L. 3\frac{1}{8}$
M.	43	{ $R. 4$ $L. 3\frac{7}{8}$	$R. 3\frac{1}{3}$ $L. 3\frac{1}{3}$
M.	$11\frac{1}{2}$	$R. \& L. 3\frac{3}{4}$	$R. \& L. 2\frac{7}{8}$
F.	21	{ $R. 3\frac{7}{8}$ $L. 4$ }	$R. \& L. 3$
F.	30	$R. \& L. 3\frac{1}{2}$	$R. \& L. 3$
F.	53	$R. \& L. 3$	$R. \& L. 3$
F.	9	$R. \& L. 3$	$R. \& L. 2\frac{7}{8}$

A REVIEW OF TWENTY CONSECUTIVE CASES OF ACUTE MASTOIDITIS TREATED BY B.I.P. AND PRIMARY SUTURE.

By F. HOLT DIGGLE, F.R.C.S., Aurist Ancoats Hospital, Manchester, late Assistant Surgeon, Ear Hospital, Birmingham, and F. B. GILHESPY, M.R.C.S., L.R.C.P., Assistant Surgeon, Ear and Throat Hospital, Birmingham.

MR HERBERT TILLEY, in March 1919, gave the results of the use of B.I.P. (bismuth, iodoform-paraffin paste) in five cases of acute mastoiditis requiring operation; demonstrating the fact that by its help primary union of the mastoid wound could be obtained even in the most septic cases.

The elimination of the tedious and prolonged period of after dressings which occurred formerly, when the wound was not sewn up at the time of the operation, and the shortened convalescence obtained by the method then described has led to its adoption in many quarters. The object of this communication is to present a series of twenty cases which have been kept under observation for a year or longer after operation, thereby enabling one to form an estimate of the permanent results of the method.

Rationale of Operation.—The cavity in the mastoid bone resulting after the removal of septic material is sterilised with B.I.P., so that the resulting blood clot which fills the cavity shall be sterile. This in turn is replaced by granulation tissue. The wound is treated as sterile and is sewn up at the time of the operation.

Technique of Operation.—It is an advantage to make the incision as near the hair line as possible, as this ensures that the suture line has the support of bone and is not lying over a cavity in the mastoid. The writers have found this incision to be important otherwise there is a tendency to gaping of the wound due to the pressure of the exudation. The mere opening of the mastoid antrum with the escape of pus and the subsequent application of B.I.P. to the cavity is doomed to failure. Anything short of thorough exposure of all infected mastoid cells is certain to result in failure, for, as is well known, the

F. Holt Diggle and F. B. Gilhespy

inflammation is not infrequently a generalized osteomyelitis of the whole mastoid process.

The wound is washed out with 1 in 20 carbolic lotion, and then syringed with methylated spirit and dried. The tip of the index finger is then lightly covered with B.I.P., which is rubbed into the bony cavity and the soft parts.

Subtemporal and subperiostral abscesses are treated in a like manner.

No masses of B.I.P. should be allowed to remain in the wound, and if more than the quantity indicated is used, excessive secretion of serum ensues and œdema, infiltration and redness of the tissues are produced round the wound.

The mastoid incision is then sewn up with interrupted silk-worm-gut sutures. These should be inserted closer together than is usual. The external auditory meatus must be disinfected and a paracentesis of the tympanic membrane performed if drainage through the perforation is insufficient.

After Treatment.—The meatus is wiped out once or twice daily with cotton wool, soaked in peroxide of hydrogen. The stitches are removed on the eighth day. The patient can leave the nursing institution on the tenth day, if necessary.

Analysis of Twenty Cases.

1. *Duration of Stay in Hospital.*—The average duration of the stay in hospital of these patients was twelve days. The first two of the series each occupied beds for over twenty days. In these early cases too much B.I.P. was used causing excessive production of serum in the wound, which had to be drained for several days, thereby delaying healing.

Another case remained in hospital for nineteen days, home surroundings were unhealthy, and the child was kept in until a profuse otorrhœa had entirely subsided. Against this a suckling baby of seven months was sent home thirty-six hours after operation and received subsequent attention in the Out-patient Department. The wound healed by primary union.

2. *Age of Patients.*—This varied from the age of seven months to thirty-five years.

3. *Type of Cases.*—In all there was a history of acute inflammation of the middle ear, and well-marked symptoms of suppuration in the mastoid antrum were present on admission. In three cases the lateral sinus lay exposed in the

Acute Mastoiditis treated by B.I.P.

Serial No.	Name and Age.	Notes on Admission.	Notes on Operation.	Stay in Hospital.	Post-Operative Remark.	Condition one year later.
1	P. C., 8 years	Temp. 100; pulse 116. Subperiosteal abscess	Very foul pus in mastoid and subperiosteal abscess	21 days (no otorrhoea on discharge)	Considerable oedema due to excessive biopsy	Not deaf. Ear discharges at times. Re-admitted 13 months after with mastoid abscess.
2	L. F., 16 years	3 weeks' otorrhoea; 2 days ago severe pain and swelling over mastoid	Mastoid cortex perforated; large apical cell full of pus	11 days	No otorrhoea on discharge	Hearing good; c.v. 6 yds.; "does not notice any deafness."
3	L. M., 9 years	Influenza 3 weeks; earache 2 weeks; mastoid swelling with otorrhoea 2 weeks	Large subtemporal abscess	26 days	Considerable oedema of wound, prolonged stay in hospital; wound healed by primary union	Membrane healed; hearing c.v. 8 yards.
4	J. P., 4½ years	Etiarache 5 days ago; otorrhoea 2 days ago; mastoid swelling 1 day	Antrum full of foul pus	7 days	No otorrhoea on discharge	Failed to report.
5	H. B., 11 years	Influenza 7 weeks ago; bilateral otorrhoea; left healed, right persisted; pain and tenderness right mastoid	Mastoid apex perforated anteriorly; antrum full of pus	9 days	No otorrhoea on discharge	Membrane healed; no deafness; small keloid lower end of incision.
6	J. D. P., 8 years	No history. Tenderness and swelling over mastoid	Mastoid antrum full of pus	14 days	Wound healed, but slight otorrhoea on discharge	Re-admitted 1 year later for radical mastoid.
7	F. M., 3 years	Left otorrhoea 3 weeks; severe pain over mastoid few days; thick oedema all round ear	Subperiosteal abscess; antrum full of pus; lateral sinus exposed	19 days	Kept in until otorrhoea ceased; wound healed	c.v. 6 yards; small inferior dry perforation.

F. Holt Diggle and F. B. Gilhespy

Serial No.	Name and Age.	Notes on Admission.	Notes on Operation.	Stay in Hospital.	Post-Operative Remark.	Condition one year later.
8	Mr M., 23 years	Influenza 10 days; earache and otorrhoea 4 days; mastoid tip tender; slight deafness	Large apical abscess, apparently shut off from "Antrum," which appeared healthy	21 days	Much otorrhoea for several days; none when discharged; wound healed	Membrane intact; c.v. 20 feet.
9	W. W., 30 years	Left earache and otorrhoea 3 weeks; mastoid very tender	$\frac{3}{4}$ " oedema over mastoid; pus in antrum; lateral sinus exposed, covered with granulations	10 days	Quite healed; no otorrhoea; oedema all subsided	Membrane healed; occasional tinnitus; c.v. 6 yards; "would not call himself deaf."
10	A. R., 13 years	No record	Antrum full of pus	13 days	Wound healed; hearing good	Failed to report.
11	J. H., 14 years	No record	Large subtemporal abscess; mastoid antrum full of pus	13 days	Wound healed; no otorrhoea	Failed to report.
12	D. E., 4 years	Right otorrhoea (acute)	Large cavity in mastoid full of pus	8 days	Healed; on discharge, slight mental discharge	No discharge; c.v. 8 yards; Father says: "Is not deaf."
13	E. S., 7 months	Mastoid swelling 1 week, with otorrhoea	Large mastoid subperiosteal abscess; mastoid full of pus	36 hours	Sent home because of suckling and screaming; wound treated in O. P. D.; healed 10 days; no otorrhoea on discharge	Failed to report.
14	S. I., 4 years	...	Operation book; Schwartzke bipp	8 days	...	Membrane intact; c.v. 6 yards.

Acute Mastoiditis treated by B.I.P.

Serial No.	Name and Age.	Notes on Admission.	Notes on Operation.	Stay in Hospital.	Post-Operative Remark.	Condition one year later.
15	M. W., 8 years	Oedema right mastoid; 3 weeks' earache and discharge	Large subtemporal abscess extending above and in front of ear; antrum large; pus	8 days	Primary union; no discharge	Meatus slightly narrowed; c.v. 6 yards.
16	M. F., 8 years	Fluctuating right mastoid; swelling; no otorrhœa; M.T. injected; redness of posterior meatal wall; 3 weeks' history	Large carious mastoid antrum full of pus; dura of middle fossa exposed; perforation of outer wall	8 days	Primary union	c.v. 5 yards; slight deafness. To come in for removal of tonsils and adenoids.
17	M. G., 35 years	Left otorrhœa; 2 weeks' oedema; tenderness over mastoid. T. 99.6	Mastoid cells, especially large apical cell, full of pus; none in antrum	10 days	No otorrhœa; hearing on discharge; c.v. 7 yards	c.v. 8 yards; M.T. healed.
18	S. S., 10 years	Otorrhœa right; 2 weeks' swelling (abnormal) and behind mastoid. P. 122; T. normal	Lateral sinus exposed, covered with granulations; pus in mastoid	12 days	Primary union; no otorrhœa	Healed; ear dry.
19	R. B., 16 years	7 days' history of left otorrhœa; tenderness over mastoid	Large cells full of pus extending backwards over lateral sinus	10 days	...	M.T. healed; hearing c.v. 7 yards.
20	Nurse, 18 years	Otorrhœa left; profuse and persistent in spite of paracentesis; no mastoid tenderness; M. tym.; bulging posterior	Antrum full of pus under pressure	10 days	Healed; no otorrhœa	c.v. 8 yards; M.T. intact.

F. Holt Diggle and F. B. Gilhespy

mastoid cavity and was covered by a layer of granulation tissue; nevertheless no trouble in the sinus followed the closure of the wound; in other words, the septic process had been completely arrested and did not recur after closure of the previously infected cavity. Of course, the method is not applicable in cases of sinus thrombosis. The dura mater was found exposed in two cases. A large subtemporal abscess was present on several occasions.

Edema of the tissues over the mastoid was marked in 50 per cent. of the cases. This went down rapidly after operation.

4. *Hearing*.—At the discussion, which followed the introduction of this method by Mr Tilley, it was suggested that B.I.P. might have a bad effect on the hearing. In the present series of cases seen one year after the operation, it is most conclusively seen that the fear was groundless. A few of the statements made by the patients or their parents are given—"does not notice any deafness," "is not deaf," "would not call himself deaf." Low conversational voice was heard at six yards on the affected side in all cases.

5. *Keloid Formation*.—The irritation of B.I.P. has not resulted in the formation of keloid in the line of incision. It may be remarked that the lower the wound is carried in any operation in the mastoid region the more liability is there to keloid formation in the lower end of the incision.

6. *Recurrence of Mastoid Trouble*.—When brought for inspection thirteen months after operation, F. C., aged 8 years, was brought up with a mastoid swelling. The signs were those of a cold abscess. After opening a large subtemporal abscess, the cavity in the mastoid bone was found lined with pale leathery granulation tissue. The mother said that the child had suffered from a cold for a fortnight previously.

J. D. P., aged 8 years, was seen eleven months after operation, when the mother brought the child to the hospital because of swelling over the mastoid. It was found necessary to perform a radical operation owing to the widespread infection present. In this case the discharge had not cleared up after the initial operation and the surgeon in charge of the case had been given an erroneous history, the discharge from the ears having been more chronic than he was led to believe.

Conclusions.—1. The method was put forward by the originator to demonstrate a means whereby the after treatment

Acute Mastoiditis treated by B.I.P.

of cases of "acute mastoid" could be shortened. This advantage has been convincingly demonstrated. In a busy hospital where 200 mastoid operations are performed a year, the saving of beds and labour is enormous. 2. The granulations which fill, or partially fill, the mastoid cavity are not proof against a further invasion of infection by "way" of the Eustachian tube. In every operation on the mastoid antrum the condition of the posterior nares and throat should be attended to.

CLINICAL RECORD

CRANIAL OSTEO-MYELITIS COMPLICATING ACCESSORY SINUS SUPPURATION.

By NEIL MACLAY, Newcastle-on-Tyne.

DIFFUSE cranial osteo-myelitis is a rare disease and the mortality therefrom is very high.

When we exclude those cases which are due to syphilis, trauma of the cranial bones and pyogenic disease of the temporal bone, we find that suppuration in the nasal accessory sinuses is by far the commonest cause of this dire malady.

When occurring in connection with accessory sinusitis, it may be classified as post-operative and spontaneous: the former is the more deadly type with a mortality of 100 per cent. in the recorded cases.

Pathologically the disease may be described as a purulent rarifying osteitis which ultimately produces a more or less complete destruction of all the bone elements.

The diploë become replaced by granulation-like tissue and pus, and as the pyogenic process invades the two tables of the bone, collections of pus form under the pericranium and between the bone and the dura mater. The route by which the infection reaches the bone has not been determined in any definite way, and though many observers blame the diploë, there is some ground for the belief that the disease may begin, at all events in some cases, in the bones forming the inner angle of the orbit which are devoid of diploëtic substance.

The disease has an insidious onset, and until the diploë are involved there may be much uncertainty as to the nature of the condition and very valuable time lost before treatment is commenced in earnest.

In the post-operative variety the appearance of a small inflammatory swelling about the site of operation, accompanied by headache and pyrexia and followed by the characteristic puffy or circumscribed œdematous swelling of the scalp, with œdema of the eyelids, should complete the diagnosis and call for immediate action. Remissions or periods of calm, when all seems well, are a characteristic and heartbreaking feature of the disease.

Cranial Osteo-Myelitis

I have dealt with three cases of diffuse cranial osteo-myelitis, two of which were post-operative and one spontaneous and arising in connection with suppuration in the frontal sinus. The spontaneous case and one of the post-operative cases recovered.

According to the published records, the prognosis in the post-operative variety is so uniformly bad that I think the following history of a case believed to be cured will be of some interest and encouragement.

J. B., æt. 30, consulted me towards the end of June 1920, complaining of nasal obstruction and dropping of discharge into the back of his throat.

History.—He had apparently never been robust and had been troubled with a recurring cough for some years, but there was no history of nasal symptoms till 1918, while on war service in France. He then became aware of some nasal stuffiness and discharge and occasional frontal headache.

Condition on Examination.—He had a sallow complexion, looked under weight, and was obviously obstructed in his nose.

The nose was packed full of mucous polypi, and there was evidence of pus anteriorly on both sides. The mouth and fauces were clean and posteriorly polypi could be seen in the choanal openings with streaks of pus on the posterior ends of the inferior turbinals. Transillumination and radiography suggested pansinusitis. He had no pyrexia and no complaint of headache.

In July 1920, nasal polypi were removed by the cold snare on two occasions and the antra were punctured, giving proof of the presence of pus. The pus yielded a luxurious growth of *staphylococcus aureus*.

During the last week of July 1920 he was given a general anæsthetic and an intra-nasal operation was performed upon the antra, at the same time the ethmoidal cell areas were dealt with by means of the ring knife and nibbling forceps, and the fronto-nasal passages were cautiously enlarged with a rasp.

He appeared to be making a good recovery from the operation, and there was no ecchymosis or other sign of trauma externally till the sixth day, when a small swelling appeared at the inner angle of the left orbit accompanied by a little puffiness of the eyelids on the left side. At the same time he complained of some headache, and the little swelling rapidly became red and soft. His temperature registered 99°.

The inflammatory swelling was opened and a very small quantity of pus evacuated. A probe failed to detect bone and the abscess was regarded as superficial. The redness subsided tardily, as did the œdema of the eyelids.

Neil Maclay

At the end of the first week in August 1920 the local and general conditions had improved sufficiently to lead one to suppose that all would be well. At this time I went on holiday and did not see the patient again till early in September, when his condition aroused in me some concern.

He complained of headache, chiefly occipital; the root of his nose was swollen and the left eyelids were much more œdematous than they had previously been; there was also a little œdema of the right eyelids, as well as the scalp over the left frontal sinus, and above the root of the nose. The temperature was 99.4° .

Under general anæsthesia an incision was made in the middle line of the forehead, commencing $2\frac{1}{2}$ inches from the nasion and extending down the middle of the nose, and this was joined by an incision along the left supra-orbital margin.

The left nasal bone was found to be in great part necrosed and was removed, together with a part of the nasal process of the maxilla, and a portion of the nasal process of the frontal and the lachrymal bones. The whole of the anterior wall of the left frontal sinus, including the bridge and a good part of the floor, was removed, as well as the outer table of the frontal bone immediately above the sinus where there was unmistakable evidence of osteo-myelitis. The whole area of operation was treated with B.I.P.P. and incompletely sutured.

The local and general conditions seemed to improve, and the temperature, which was never higher than 100° , became normal and even subnormal. It is worthy of note, however, that the headache, though lessened, did not for one whole day subside, and there was always some purulent discharge from the upper end of the scalp wound.

An autogenous vaccine was employed at this period.

On 8th October 1920, that is about a month after the last-mentioned operation, a circumscribed œdematous swelling appeared higher upon the forehead and to the left of the middle line. The puffy tumour was exquisitely tender to pressure. Temperature rose to 99.4° and the headache became aggravated. In the meantime the eyelids on each side became very œdematous and patient could not see out of his left eye. On 9th October 1920 the median incision in the scalp was re-opened and extended farther up and at same time a transverse incision was made at the level of frontal eminence and the flap turned aside.

Under the site of the puffy tumour the bone was necrosed and bathed in pus—it had a worm-eaten appearance. The necrosed area about the size of a florin was removed and the dura mater exposed.

The margin of the resulting hole in the bone was seen to be



Cranial Osteo-Myelitis

invaded by granulation tissue and pus between the tables. This was nibbled away until what looked like healthy bone was reached. B.I.P.P. was employed and gauze drainage with partial suture.

The eyelid oedema subsided quickly but not completely, and the patient felt better, though the headache still persisted. During the rest of the month of October the temperature remained normal or subnormal, and the wounds were much cleaner.

On the 30th of October 1920 another puffy swelling appeared, this time on the right of the middle line, and the eyelids again became very swollen; the temperature rose to 100.6° , pulse 90.

On 1st November 1920 an incision was made so as to expose both frontal sinus areas, and the median incision was re-opened and extended farther up. The right frontal sinus was ablated and bone removed from the right half of the frontal. It was found at this time that there was an extra-dural abscess, and the septic granulation tissue had invaded the bone right up to the middle line. Nine days later a tender spot was discovered above the frontal eminence on the left side, and a fresh exposure of the skull ensued and necrosed bone, and a large extra-dural abscess dealt with.

This melancholy history was repeated on three subsequent occasions, the last operation being performed on 15th January 1921.

From first to last the greater part of the left half of the frontal bone up to the coronal suture was removed, and a strip 2 inches wide of the right half up to the same suture. When once the septic process ceased, healing took place rapidly, leaving the large pulsating dural area covered only by scalp. After the last operation the headache which had persisted for so many months disappeared at once, and the whole facial aspect changed and anxiety gave place to repose.

The rapidity with which new bone has formed and covered over the exposed dura is to me very surprising. At the end of three months there was only an area about the diameter of a florin on the left side where pulsation could be seen, and now the pulsation is barely perceptible.

There is, I think, good reason for the belief that in this case the osteo-myelitis began in the bony framework of the nose and not in the diploë of the frontal bone, and I cannot help thinking that in some of those cases where the disease has followed external operation, the route of infection is probably identical.

CRITICAL REVIEW

THE VALUE AND DEVELOPMENT OF RESIDUAL HEARING *

By DR MAX A. GOLDSTEIN, St Louis.

THE preservation of hearing, whether applied to the child or the adult, has been frequently discussed at otological and medical gatherings, and the view-points expressed have usually been centred in special local therapy, surgery, and in elaborate discussions of etiology. The conservation of hearing, as generally considered, has included a differential diagnosis between sound-conducting and sound-perceiving types of impaired hearing, the destruction of, or pathological changes in the membrana tympani, ossicular chain or tympanic cavity, contraction or obstruction of the Eustachian tube, the presence of tonsils, adenoids, and neoplasms in the nose and pharynx, suppurative processes in the middle ear and its complications, influenza, meningitis, and other specific infections, and the less understood local and systemic infections that may give rise to serious disturbances in hearing.

The problem which I desire to emphasise and discuss is the value and development of *residual* hearing, for it includes a different range of subject-matter, and its disposition is not necessarily local therapy or surgery. I have attempted to classify deafness into types so that all cases may be definitely grouped and better studied clinically.

GROUP I. *Lymphatic Type*.—The lymphatic diathesis is characterised by hypertrophied tonsils, adenoids in the naso-pharynx, lymphoid nodules throughout the upper respiratory tract, pale and soft Schneiderian membranes with tendencies to frequent and various aerobic infections whereby a mechanical blockage of a more or less permanent character is developed in the tubo-tympanic tract, tissue metabolism changed, and the functions of the conducting apparatus of the ear impaired.

Functional tests usually corroborate the clinical diagnosis of impairment of the sound-conducting mechanism.

In the otology of twenty-five years ago, we found frequent references to large groups of these cases as reported in the statistics of schools for the deaf throughout the country, in which the reporters concluded that the aggravated deafness was due to unrecognised and neglected adenoids. At that time the keen discovery

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Development of Residual Hearing

of the immortal Scandinavian, Dr Wilhelm Meyer, had not yet penetrated the medical profession as an important etiology of deafness.

With the better comprehension of the pathology and surgery of Waldeyer's lymphatic ring, much of the evil aftermath in this group has been held in abeyance. Prompt intervention not only removes mechanical obstruction to ventilation and sound-conduction, but also prevents the more serious adhesions, retractions, contractions, and absorptions in the tympanic and tubo-tympanic areas, where severe and permanent deafness may ensue.

GROUP II. *Exanthematous Type*.—As most of the exanthemata have their focal infection in a specific angina, and as the local invasion so frequently includes the ear tract, we have a ready accounting for the frequency with which suppurative processes invade the tympanic cavity in this group. The suppurations seem to be of a specially destructive type, for the membrana tympani is often sloughed in a large radius, the ossicles necrosed, and the walls of the tympanic cavity eroded. Similar erosions are found about the fenestra ovalis and rotunda, and these lead to permanent ankylosis or bony changes in this part of the labyrinthine wall.

It is a significant fact that many children with total deafness date their misfortune from an intense invasion of an exanthematous fever. Close observers have concluded that such invasions carry with them not only a destructive process centred in the tympanic cavity, but a toxic, selective attack either on a part of the labyrinthine structures, on the ramus cochlearis, or in the form of a localised meningitis.

Careful functional tests in this group reveal impairment of both low and high ends of the cochlear scale, and often simulate the clinical tests of oto-sclerosis. There is this difference, however, between an incipient oto-sclerosis and an exanthematous invasion of the labyrinth—in oto-sclerosis the basilar and apical Corti cells are involved, and a large part of the central scale still functionates; in some types of exanthematous invasion of the labyrinth the cochlear cells may be intermittently and irregularly attacked, producing definitely recognised and still functioning tone-islands throughout the cochlear scale.

GROUP III. *Central Type*.—In epidemic meningitis, poliomyelitis, and exanthemata with intense febrile reaction, we frequently find a sudden attack on the auditory central organ and total deafness. The following brief clinical report will illustrate:—An intelligent, normal girl of sixteen was attacked on Christmas Day by epidemic meningitis, with all of the characteristic symptoms of this infection. She was seriously ill for a week, joined the family at dinner on New Year's

Max A. Goldstein

Day, recovered from meningitis but totally deaf. Here again we note a selective localised meningeal attack on the nerve trunks.

Functional tests with all forms of sound-producing apparatus, including tuning forks, voice, musical instruments and gongs, failed to produce any sound impression. Even if the labyrinth end-organ has escaped attack, if both auditory nerves in their trunk have been invaded by toxins and destroyed, the deafness must be complete.

GROUP IV. *Oto-sclerotic Type*.—Much has been written about oto-sclerosis, but we are still undecided as to its pathological entity. As it occurs less frequently in the child and the youth than in adult life, it does not figure to so large an extent in this problem of residual hearing and its development.

There are several clinical and pathological data which seem fairly constant in this group. We have every reason to believe that a spongifying or sclerotic change in the labyrinthine capsule takes place; the point of most frequent attack seems to be about the foot-plate of the stapes; the membrana tympani frequently shows no change in plane or lustre other than a circumscribed pink spot; the tuning-forks and Galton whistle give evidence of a diminished perception for both low and high tones; bone conduction is prolonged beyond the normal and a paracusis is usually present in incipient cases.

GROUP V. *The Congenital Type*.—One of the most serious factors in the production of profound deafness is that of congenital transmission. Interesting statistics have been compiled, showing the large percentage of total deafness evolved in the matings of the congenitally deaf and of consanguineous marriages. We are here concerned, not with a pathological but with a biological question. At a former meeting of the American Otological Society I showed, among a series of microscopic sections of the labyrinth, one of a congenitally totally deaf child. The most interesting phase of this specimen was that the cochlear nerve in the labyrinth was shown to consist of only a nerve sheath and contained no vestige of neuroglia or nerve substance; the nerve presented the appearance of an empty shaft. Or, we may find a congenital atresia or absence of the external ear, or of the tympanic cavity or its contents, and a consequent unestablished (?) hearing mechanism. These brief descriptions illustrate my point of a biological absence of tissue rather than a pathological destruction or degeneration.

A functional test with tuning-forks and other sound-producing apparatus in this group elicits no response to any sound-perception, for if the cochlear or peripheral element is absent, no central sensory impression can be conveyed.

GROUP VI. *Hereditary Type*.—We should distinguish between the congenital type in which a transmissible absence of a part of the

Development of Residual Hearing

auditory nerve mechanism may be found, and the hereditary transmission of a degenerative element, as in rickets or syphilis. In syphilis the cochlear nerve or the ramus cochlearis may be present, but may have undergone sufficient degeneration in embryo or in early childhood to present decided pathological changes.

Functionally such a differentiation could perhaps not be made by sound tests. Here we might avail ourselves of the Wassermann reaction, preferring spinal puncture to blood examination, and it is not unreasonable to hope, if such laboratory findings corroborate a syphilitic diagnosis, that an anti-syphilitic treatment may, even in cases of profound deafness, produce improvement in hearing.

GROUP VII. *Benign Type*.—Impaired hearing caused by recurrent coryza, deflected septum, hypertrophied turbinates, polypi (mucous or fibrous), adenoids, tonsils, malformation of the palate and choanæ, chronic suppurative otitis media, large perforations of the membrana tympani, etc., where the mechanical influences of obstruction have not developed permanent secondary pathology, such as adhesions, obstructions in the tube, necroses of the ossicles, partial destruction of the tympanic walls, may be classified as a separate group where the necessary surgical and therapeutic treatment may greatly improve the hearing and restore practical auditory usefulness.

A long experience in the examination and observation of deaf children leads me to the definite conclusion that functional tests to determine the degree or profundity of deafness as carried out by the otologist is of less practical value or application than similar conclusions reached by the experienced teacher of the deaf. The main dependence of the otologist for differential diagnosis of the functioning character of the ear is the tuning-fork, but when a profound degree of deafness exists, as is the case in so large a proportion of congenitally deaf or even adventitiously deaf young children, the tuning-fork becomes a factor of lesser value.

To cite a practical example:—The parent of a two- or three-year old child consults the otologist as to his auditory status. The parent states: "I think my baby must have heard, for, when it was about one year old, it seemed to prattle and babble and apparently observed persons and things, and showed some sense of direction to sounds. Six months later the child had a sudden febrile attack for several days (perhaps teething, grippe, enteritis, etc.), and since then he babbles less and does not respond to the sound of voices when trying to attract his attention. Loud noises and the clapping of hands startle him but do not seem to arouse him. Doctor, is my child totally deaf, and what do you advise me to do for him?" The report of the otologist which usually accompanies such a case states: "This child hears neither voice nor tuning-forks, and I have referred the

Max A. Goldstein

parents to you for advice and educational direction." With this brief experience the otologist thinks he absolves his responsibilities in such a case.

Later observation in the course of the mental unfolding of such a child often reveals the presence of an uneducated or latent auditory word centre, imperfect Wernicke, lack of co-relation between Broca and Wernicke, or some other undeveloped or imperfectly stimulated speech or hearing centre.

It is to the minute study of these speech and hearing centres, and their more intimate relation to the various types of serious deafness, that I wish to direct your attention and more earnest consideration. Our experience in the re-education and mental reconstruction of soldiers made deaf and defective in speech by shell-shock, shell-concussion, and war casualties, has proven the practical value of the careful study of these centres, and has substantiated the theories and physiological findings attributed to these brain areas. The practical results of re-education or restimulation of speech and hearing have been so thoroughly demonstrated in the group of reconstruction cases in our experience, that the importance of similar measures applied to the training of the deaf child cannot be too greatly emphasised.

Residual hearing or remnants of hearing are vital elements in the pedagogic training of the deaf child. Such hearing remnants may be so negligible as to offer but limited reconstruction material; on the other hand, as has been frequently stated, 30 per cent. of all children found in schools for the deaf throughout the country have sufficient residual hearing to perceive the human voice to varying degree (from the hearing of elementary sustained sounds to that of fluent speech), and the cultivation of this residual hearing may, in a large group of such children, place them in a position where they may eventually be considered only as hard-of-hearing individuals instead of as deaf-mutes.

Attempts have been made to classify the degrees of deafness. I have carefully analysed such claims and statements, but fail to find on what standard or basis such estimates are made. Reports have been sent to me with the statement of the otologist:—"This child has 50 per cent. hearing; this child has 25 per cent. hearing." I must admit that with our present classification of the degree of deafness, I am unable to understand just what is meant by such a statement.

I think it would be a very practical asset to develop such classification, but it must be dependent on definite standards and on careful otologic and pedagogic tests.

The status of the deaf child of the future will be best recognised

Development of Residual Hearing

by a liberal co-operation between the otologist, the psychologist, and the experienced teacher of the deaf.

Many of the observations included in this paper require further careful corroboration to make them of definite scientific strength. If the classification of nerve-deafness into the several groups above referred to is scientifically consistent, and if the results of the application of the Acoustic Method depend on the stimulation or re-education of unawakened, poisoned, or degenerated nerve tissue, we should be in a position to even establish a pedagogic prognosis. We must consider the history of the pupil, congenital and hereditary factors, the character of the disease from which deafness dates, the general, physical, and mental development of the case, and the responsiveness of the pupil to systematic acoustic training. There are imperfections in the pedagogic training; much of the physiology and pathology of the acoustic mechanism is still but vaguely understood; a comparatively short time for practical study and impartial analysis has elapsed, and larger groups of pupils must be observed by specially trained teachers and otologists to summarise the end-results and establish a practical potentiality.

There has at last been an awakening of the otological profession to the significance and importance of this problem, and as soon as more of our colleagues study these questions seriously a new era for the deaf child is sure to develop.

SOCIETIES' PROCEEDINGS

THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

ROYAL INFIRMARY, GLASGOW.

December 11, 1920.

President—Dr A. A. GRAY.

Paralysis of Palate following Non-Diphtheritic Sore Throat—Dr W. S. SYME.—Female, aged 17. No albuminuria; negative diphtheria; streptococci and staphylococci only. Later, paralysis of the palate and vision affected, but still no diphtheria bacilli. Opinions of members differed as to whether this was or was not a case of post-diphtheritic paralysis.

Left Antral Disease associated with Severe Trigeminal Neuralgia, and with Great Increase of Bone in External Antral Wall and Floor, and in Malar Region—Dr W. S. SYME.—Male, aged 69. Left trigeminal neuralgia for ten years. Resection of infra-orbital nerve, alcohol injections, and Gasserian ganglion resection produced only temporary relief. When seen by exhibitor, both antral cavities foul. Radical antral operation on both sides a month ago. Since operation patient has been free from severe pain.

Clonic Spasm of Palate—Dr W. S. SYME.—Female, aged 24. Following a severe fright, patient became affected with spasm of palate. The soft palate contracts forcibly and regularly at the rate of 168 a minute: clicking sound audible to the patient, and a loud booming sound heard through auscultating tube. No other evidence of a nervous affection.

A New Method of performing the Operation of Partial Thyroidectomy without Ligation of any Arteries, with Cases shown—Dr JAMES HARPER (published in *Journal of Laryngology*, March 1921).

Cyst of Epiglottis—Dr JOHN L. HOWIE.—Female, aged 14, shows a typical cyst, situated on the right upper surface of the epiglottis.

Case of Pulsating Vessel in Pharynx—Dr JAMES DONALD.

Otological and Laryngological Society

Nystagmus produced by Inflation—Dr JAMES ADAM.—Male, aged 50, complaining of increasing deafness for a year or two, and recently of giddiness, especially on stooping and on exertion. Admits chronic suppuration of left ear in childhood. Blood-pressure has varied from 140 to 160: repeatedly after inflation of left ear there has been violent nystagmus, rotatory to left, and severe giddiness lasting about thirty seconds.

Trout Fly, with Fishing Gut attached, removed from the Laryngeal Pharynx by the Indirect Method—Dr A. LOGAN TURNER.

Tumour involving Right Antrum and Post-nasal Space—For Diagnosis—Dr G. B. BRAND.—Male, aged 45. Nasal obstruction for three years: swelling of right cheek, intermittent epistaxis: pressure on cheek causes flow of pus from nostril. In right anterior nares fairly firm growth, bleeding when touched. Cauliflower growth blocking choana. Right antrum, no illumination. X-ray, no blurring of antra. Tumour probably malignant.

Sublingual Dermoid Cyst—Dr ALEX. STRANG.—Girl, aged 20. A soft swelling about the size of a hen's egg on buccal floor; the tongue is seen to be pushed somewhat towards the roof of the mouth.

Nystagmus of Pharynx and Larynx—Dr A. BROWN KELLY.—The posterior pharyngeal wall is twitched to the left, while the left posterior faucial pillar and left lateral wall are twitched to the right, so that the two movements converge; twitchings of the uvula and lower part of the left half of the soft palate in an upward direction. The left vocal cord during expiration is swung towards the middle line by six slight jerks; the nystagmoid movements in the pharynx and larynx are synchronous and number 115 per minute, while the pulse is 76.

Hypersecretion of Left Half of Soft Palate associated with Paresis and Hypæsthesia of the Face and Palate on the Same Side—Dr A. BROWN KELLY.—Male, aged 28, had influenza and pneumonia, and afterwards abscess in left parotid region. Incision was followed by left facial paralysis and left-sided deafness. The greater part of the left side of face and the left half of palate were paretic and hypæsthetic: the left half of the palate produced large drops of secretion. At a later date the patient also presented sweating of left cheek. The pareses have almost disappeared, but the localised sweating continues.

Societies' Proceedings

THIRTEENTH MEETING, ROYAL INFIRMARY, EDINBURGH.

June 11, 1921.

President—Dr HENRY PETERKIN.

A Case of Aphonia with Spastic Element—Dr P. M'BRIDE.—Male, aged 66, was aphonic save only when he assumed the forward flexed position. The exhibitor considered that there must be some physical condition which thus facilitated voice production, but after the patient's recovery, the explanation was found to be psychological. On one occasion while bending forward to tie his bootlace with his foot balanced on a stool, he slipped and swore. He then discovered that he could speak in the stooping posture.

Rhinosporidium Kinealyi—Dr A. LOGAN TURNER and Prof. J. A. ASHWORTH.—Medical student, male aged 31, native of India, suffered from left nasal obstruction for twelve years, with much viscid secretion and occasional bleeding: the abnormal tissue presented a pinkish appearance, studded with yellowish-white dots, friable and bleeding readily. Prof. Ashworth demonstrated the spores in various stages of development and gave a brief history of the subject.

A Case of Yeast-Fungus of the Pharynx—Dr A. LOGAN TURNER and Dr W. R. LOGAN.—Female, aged 65, had suffered for one year from a feeling of discomfort in the throat, otherwise her health was good. The posterior wall of the pharynx was covered with a thick white, tenacious, felted material which extended on to the upper aperture of the larynx; the underlying mucosa was somewhat thickened, but microscopic examination of this on two occasions revealed only inflammatory changes. Wassermann negative: no Vincent, diphtheria or actinomyces; films and cultures showed a large number of yeast organisms. Subcutaneous inoculation of a mouse was followed by death in one month with similar material and yeast organisms in the pelvis of the left kidney. Dr Logan is experimenting further.

Osteoma of Left Frontal Sinus—Dr A. LOGAN TURNER.—Male, aged 35, for seven years suffered from a gradual forward, downward and outward displacement of the left eyeball—painless course: normal vision: no nasal history. X-ray showed dense shadow in left frontal sinus area. Operation showed cavity almost completely filled with a bony growth.

Cranial Osteomyelitis following Sinus Suppuration—Dr NEIL MACLAY.—Published *Journal of Laryngology*, October 1921.

Specimen of Trachea and Bronchial Tree—Dr NEIL

Otological and Laryngological Society

MACLAY.—The specimen from a child showed the diphtheritic membrane extending into the smaller bronchioles.

Cyst of the Left Ventricle of Morgagni—Dr T. RITCHIE RODGER.—Male, aged 67, hoarseness of four years' duration: no dyspnoea: a rounded, greyish swelling, size of a bean, with small vessels on its surface springing from mucosa between the left true and false cords, rested on the anterior half of the true cords on phonation. The cyst, which burst on removal, contained yellow, tenacious mucus. Normal voice and larynx one year later.

Skiagrams of a Case of Leontiasis Ossea—Dr T. RITCHIE RODGER.—Female, aged 50, had enlargement of the bones of the face when eight years old, now has external deformity, complete nasal obstruction, foul smelling discharge from nose and into mouth, a number of rhinoliths and great thickening of the bones.

Collar-stud in the Œsophagus of an Infant aged 9 months, causing Spinal Osteomyelitis and death—Dr DOUGLAS GUTHRIE.—The child had been under medical treatment for six weeks: no history of foreign body and no difficulty in swallowing. Radiogram showed dense shadow close to tracheal bifurcation; sudden death. Sectio showed base of stud in œsophagus, while the head, perforating gullet-wall, projected into an abscess occupying the body of the 3rd dorsal vertebra.

Two Cases of Cerebellar Hernia following Operation for Cerebellar Abscess—Shown by Drs D. WATSON and EWART MARTIN.—Painting with formalin, lumbar punctures and ligation failed to effect cure. One patient wore a small protective metal cap.

Case of Cerebellar Abscess—Dr J. S. FRASER.—Female, aged 12, chronic otorrhœa (left), associated with perisinus abscess. Cerebellum opened through triangular area and packed with gauze. Recovery. Of eight cerebellar abscesses operated upon by exhibitor, five recovered and three died.

Three Cases of Inner-Ear Deafness—Dr J. S. FRASER.—(1) Woman, aged 60, with unilateral deafness (left), tinnitus and vertigo; left cochlear and vestibular apparatus showed impaired function; eyes normal; nervous system normal; Wassermann negative. The case might possibly be one of early acoustic nerve tumour.

(2 and 3)—Boy and girl, aged 12 and 15 respectively. Each showed unilateral complete nerve deafness (right) with somewhat impaired vestibular function. Middle-ears normal. Both were cases probably of unilateral congenital deafness and the presence of vestibular reaction confirms the view. In syphilis and epidemic cerebro-spinal meningitis both cochlear and vestibular reactions are absent.

Societies' Proceedings

Case of Bulbar Paralysis—Dr J. S. FRASER.—Female aged 53, with inability to protrude tongue, difficulty in swallowing, loss of voice and with bilateral abductor paralysis.

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

April 1, 1921.

President—Dr W. JOHNSON HORNE.

Some Contemporary Notes of a Case of Pharyngeal Pouch, first reported 1764. Epidiascopic Demonstration—Mr ARCHER RYLAND, F.R.C.S.E.—The case, male, aged 60, with inability to swallow, five years after swallowing a cherry stone, was reported by Mr Ludlow to Dr William Hunter in 1764. The wall of the dilatation examined post mortem, consisted of the entire substance of the posterior part of the pharynx, the uniformity and thickness of both being so exact that it was impossible to ascertain at what particular point the dilatation first began. Dr William Hill pointed out that if the wall of the so-called pouch contained muscular fibres, then it was not the conventional diverticulum of the pharynx but a dilatation or pouching of the cesophagus.

Case of Lateral Proboscis—Mr PHILIP FRANKLIN, F.R.C.S.—A male infant with the appendage projecting between the nose and the right eye. Its central canal, from which fluid secretion exudes, can be traced to the depth of the orbital cavity.

Large Dental Cyst—Mr G. W. DAWSON, F.R.C.S.I.—Female, aged 44, with a large cyst of the left cheek of 25 years' duration. It contained thick purulent material, and seemed to have entirely obliterated the antrum. The anterior wall was removed and the lining membrane was peeled off.

In the discussion, attention was drawn to the difficulty which attended the closure of cyst cavities in this situation.

Retention Cyst of the Floor of Left Nostril, with Specimen of a similar Cyst, removed last year from Right Nostril of the same Patient—Mr G. W. DAWSON, F.R.C.S.I.—Female, aged 23. The case was regarded by the exhibitor, so far as he knew, as the only one in which bilateral retention cysts had been recorded.

Scarlatinal Scarring of the Pharynx—Dr DAN M'KENZIE.—Female, middle-aged, had scarlet fever when 5 years old. No history

Royal Society of Medicine

of sore throats; no operation on throat; Wassermann negative. The thin scar with smooth surface and fine edges did not resemble an old tertiary lesion.

Bilateral Abductor Paresis of Vocal Cords—Mr MICHAEL VLASTO, F.R.C.S.—Male, aged 64, had inspiratory stridor and breathlessness on exertion: the cause of the paralysis could not be ascertained, but the patient probably had had syphilis.

Professor Hobday raised the question of applying to these cases the operation of “stripping of the ventricles,” such as was performed in “roaring” horses.

Sarcoma? of Frontal Bone—Mr G. W. DAWSON, F.R.C.S.I.—Male, aged 65, with a hard, smooth, painless swelling of seven weeks' duration on the centre of the forehead above the glabella. Nasal suppuration and polypi. X-rays showed a rarefied area above the frontal sinus. Microscopic report; squamous epithelioma.

ABSTRACTS

NOSE AND ACCESSORY SINUSES

Italian Contributions to the Study of Ozæna. CIRO CALDERA.
(*The Laryngoscope*, 1920, Vol. xxx., p. 31.)

Etiology.—Cozzolino thought that ozæna was due, firstly to a scrofulous condition, and, secondly, to bacteriological action. Masini and Genta found a relative decrease in the red blood cells and an increase in the white. Gradenigo considers ozæna a paratubercular disease. Caldera and Bilancioni obtained positive tuberculin reaction in 23 to 34 per cent. of the cases. Ferreri holds that ozæna is the result of a change in the nerve-supply of the nose. In 1878, Masini stated his belief in the bacterial origin of ozæna. Strazza described a capsulated, Gram negative, non-motile bacterium, showing polar staining and growing easily on ordinary nutritive media. Pes and Gradenigo isolated a Gram-negative bacillus, pathogenic experimentally on animals. Belfanti and Della Vedova found the bacillus mucosus and a pseudo-diphtheria bacillus in sixty-three consecutive cases. Cozzolino found the Abel-Löwenberg bacillus constantly present: he denied the importance of the pseudo-diphtheria bacillus. De Simoni published negative results of experimental inoculations of ozæna in several tuberculous and scrofulous subjects, using the cultures of germs isolated from ozæna crusts. He felt that in addition to the organisms there was needed a peculiar predisposition on the part of the nasal mucous membrane. Later De Simoni pointed out the existence of three classes of bacillus mucosus, and thought that the three classes were derived from a common type, namely, the Friedländer bacillus. Tanturri renewed the experiments of Perez without, however, obtaining any appreciable result as regards atrophy of the turbinals, or any other nasal change. Caldera confirmed Tanturri's results and carried out also the serodiagnostic reaction in many cases of ozæna. In no case did he obtain a complement-fixation. Caldera admits the frequency in ozæna of the bacillus mucosus, but denies its specific action. The author believes that ozæna is not a contagious disease; the bacteriological factor accounts for the production of the foul odour, but the malady itself depends upon peculiar organic conditions, such as the lymphatic diathesis. In 1918, Lasagna repeated the experiments of Perez on rabbits. He used intravenous and submucous injections. He plugged the nose with gauze soaked in microbic culture, after having first cauterised the

Nose and Accessory Sinuses

mucous membrane. He also injected an emulsion of ozænous crusts under the mucous membrane. The results were negative.

Therapy of Ozæna.—Morra recommended boric acid, aseptol, thymol, resorcin, and menthol. Gradenigo advised iodine and oxygenised water. Malacrida employed essential oil of turpentine. Masucci and Felici reported good results with vibratory massage. Cozzolino advised scraping of the nasal mucous membrane. Antidiphtheritic treatment was tried by Della Vedova, Gradenigo, and others. The good results were purely transitory. Ferreri advised the application of creosote diluted in alcohol and glycerin. Montodo De Francesco published the first case of rapid and permanent recovery from ozæna following an accidental infection with erysipelas. Dionisio proposed luminous radiations, and obtained good results in one hundred cases. He also reported the first results obtained by submucous injections of warm paraffin in ozæna. De Palma obtained advantageous results by means of the high frequency current. Brugnattelli advocated the use of oxygenised water, and of a 3 per cent. solution of lactic acid. In 1916, Caldera recommended plugging the nose for half an hour every day with gauze soaked in ox bile sterilised at 100° C., or in 3 per cent. watery solution of sodium taurocolate. This treatment is an adjuvant to the favourable results of paraffin therapy.

J. S. FRASER.

The Technique of a Radical Frontal Sinus Operation, which has given me the Best Results. By Dr R. C. LYNCH, New Orleans. (*The Laryngoscope*, January 1921, No. 1, Vol. xxxi.)

Dissatisfied with the usual methods, Lynch has developed a technique which, he claims, has given him 100 per cent. cures. He bases this claim on a series of fifteen cases, over a period of two and a half years. After a very thorough preparation for an aseptic operation, he employs an incision as for the Killian operation, but does not extend the incision beyond the supraorbital notch, unless found necessary later. The periosteum is elevated only from the lower half of the incision. Bone is now removed so as to obliterate the orbital extension of the sinus; the rest of the sinus is curetted free of mucous membrane; this is possible in very large sinuses without opening through the anterior wall. The entire ethmoid labyrinth, and if necessary the anterior wall of the sphenoidal sinus, is cleared away. The wound is closed without external drainage. In each of the fifteen cases there has been "perfect healing, no discharge, no scarring, and a perfect cosmetic result."

ANDREW CAMPBELL.

Abstracts

PERORAL ENDOSCOPY.

Functional Signs of Œsophageal Cancer. Dr J. GUISEZ. (Paris, *Bulletin D'Oto-rhino-Laryngologie*, May 1920.)

The author gives a short statistical summary, based on 1600 cases personally examined by œsophagoscope; 950, or 59 per cent., were cancers. In a shorter series the condition was found eleven times more often in men than in women; the youngest patient was fourteen, the oldest eighty, but between fifty and sixty years was far the commonest age of incidence. In 55 per cent. the middle third of the œsophagus was affected.

The typical onset is described—a painless difficulty in swallowing is by far the commonest symptom; the onset is rapid, and bread and meat are found to be the first foods with which difficulty is noticed. This sudden, painless obstruction of a hitherto normal œsophagus, the author considers almost pathognomonic of cancer. Once established, it progresses so that semi-solids and finally liquids cannot be swallowed. The patient knows what size and consistence of bolus he can swallow, and he masticates and salivates his food accordingly. In some cases hypertrophy of salivary glands had produced the appearance of mumps.

Pain is a rare symptom; it is due to extension to intercostal nerves and is usually felt between the shoulder blades. The tumour being usually lateral, dilatation is not common, and “œsophageal vomiting” rare. Progressive wasting is due to the interference with nutrition; “cancerous” cachexia is not observed. Appetite is good, and the wretched patient may die of hunger or thirst, longing for food, which he knows he cannot swallow. The wasting and anæmia is rapidly relieved by successful gastrostomy. Hæmatemesis is rare, but slight bloody streaking of the expectoration is characteristic. A fetid breath is very common. There is no tendency to early appearance of secondary growths, and the patient dies of starvation before the disease extends. The larynx is affected by direct extension, or by involvement of recurrent laryngeal nerves, the left, being involved in the tumour or in pericœsophageal inflammation.

Latent cases, in which ulceration of a large vessel is the first warning, are occasionally seen. But the common form is usually latent in the sense that the patient does not notice any symptoms until the growth is well established. In the upper end of the œsophagus, the pharynx is involved, and pain is early and severe. At the lower end, the signs and symptoms are those of gastric cancer.

Conditions which may simulate cancer are (1) compression by an aneurysm; (2) cicatricial stenosis, in which a history of trauma is usual; (3) inflammatory stenosis with spasm. Syphilitic stenosis is very rare (.13 per cent.).

E. WATSON-WILLIAMS.

Peroral Endoscopy

Two Cases of Foreign Body in the Left Upper Lobe Bronchus.

H. VON FIEANDT and Y. MEURAN. (*Acta Oto-laryngologica*, Vol. ii., fasc. 4.)

In the first case, a boy 12 years of age, the foreign body, which had been inhaled a fortnight previously, was a part of a musical wind instrument, and consisted of a rubber ring 9 mm. in diameter (which was concentrically fixed in the left lower lobe bronchus), and of a tin piece (in the upper lobe bronchus) attached to it. It was removed under local anæsthesia at the third attempt. Neither physical examination nor X-rays gave any hint as to the site of the foreign body.

The second patient, a girl aged 7 years, had inspired a calf's tooth three months previously. Both the physical signs and an X-ray examination gave indications, although somewhat indefinite, as to the site of the foreign body. The greater part of the tooth lay out of sight in the left upper lobe bronchus, while a small jagged portion of its root was visible in the main bronchus. It was removed at the first attempt under chloroform anæsthesia.

The author remarks that while the second case shows the value of a thorough physical examination, the first is a good example of those in which bronchoscopy is the sole means, not only of treatment, but even of diagnosis.

THOMAS GUTHRIE.

External Oesophagotomy for Extraction of a Denture from the Thoracic Oesophagus. MENGONI & CAUCCI. (*Arch. Ital. di Otol.*, Vol. xxxi., No. 3, 1920.)

A man, aged 30, gave a history of having swallowed his upper denture the night before. The denture was a small one carrying two incisors and had one hook. The patient had missed his teeth in the morning and could not find them anywhere. Soon afterwards he felt a weight in his chest and a pain at the top of the sternum. He made several attempts to vomit. He found that he could not swallow even liquids. He spoke with considerable difficulty, looked ill, and kept his head inclined slightly to the left. Examination of the larynx with the mirror and the finger were negative. X-rays showed the foreign body at the level of the left sternoclavicular articulation with the hook directed upwards. Attempts at removal with forceps were unsuccessful, and Bruenings' oesophagoscope was then tried. The denture could be seen, but attempts at extraction were unsuccessful. As soon as the instrument was removed the patient announced that he felt as though the foreign body was no longer there. He could move his head, speak, and swallow water fairly easily. A second X-ray picture was taken, which showed the foreign body in the same position still, although a sound could now be

Abstracts

passed past it. The œsophagoscope was again passed under ether to eliminate spasm, but no success was obtained. External operation was then decided on and an incision was made at the root of the neck and the œsophagus exposed. It was opened and explored with the finger, but the foreign body could not be felt. Long forceps were introduced and the object grasped. It was drawn up and removed by movements from side to side. The wound was drained for a few days and rectal feeding instituted. The subsequent recovery was uneventful.

J. K. MILNE DICKIE.

Foreign Bodies in the Bronchi. IMPERATORI. (*The Laryngoscope*, 1920, Vol. xxx., p. 386.)

(1) Child, 14 months old, while playing on the floor, was suddenly seized with a severe strangling attack, which lasted for over an hour. Several attacks of dyspnœa and increasing cyanosis during the next four days. Temperature 101°, pulse 140, respiration 48 on admission. Radiographs failed to show anything, except that the diaphragm on the right side was flat. The passage of the 4 mm. tube was somewhat obstructed between the cords. A foreign body was seen in the lower end of the right bronchus, and removed. It proved to be a branching grape stem. The time for this procedure was eight minutes. No anæsthetic was used. Cyanosis, however, increased with inspiratory dyspnœa. Tracheotomy was done but the child died. (2) Male, aged 8 years, inspired a steel ball in play, and for two hours had severe dyspnœa, from which he recovered next day. He complained of pain in the left chest. Radiographs showed a spherical foreign body located in the left bronchus; left side of chest very cloudy. A 7 mm. Jackson bronchoscope was used, and with the aid of a Hubbard hook the ball was dislodged and extracted with the four-pronged Brünings forceps. Recovery. Imperatori remarks on the difference in the radiographs of the chest before and after removal of the foreign body. The latter showed both sides clear.

J. S. FRASER.

Fluoroscopic Bronchoscopy, Œsophagoscopy, and Gastroscopy. R. C. LYNCH. (*The Laryngoscope*, Vol. xxx., 1920, No. 11, p. 714.)

The author records the case of a patient who inhaled a screw four years previously. On admission there was a pulmonary abscess about two inches in diameter with fairly thick walls. The corresponding bronchus was found entirely closed, but Lynch managed to uncover a path which led into the abscess cavity. Under the guidance of the fluoroscope, forceps were now inserted and seen to grasp the foreign body. It was possible to watch the extraction

Miscellaneous

of the tube, screw, and forceps until the foreign body was finally delivered.

A baby of two years swallowed a "quarter" which slipped into the stomach, where it lay for two weeks. The fluoroscope determined that it was probably nearer the greater curvature but toward the pylorus. A gastroscope was passed into the stomach, and after moving the patient on the side and then on the back, Lynch finally placed the tube over the body and removed it.

J. S. FRASER.

MISCELLANEOUS.

A Condemnatory Note on the Use of Paraffin in Cosmetic Rhinoplasty.

SEYMOUR OPPENHEIMER. (*The Laryngoscope*, Vol. xxx., p. 595, 1920.)

Gersuny, in 1900, was the first authority of note to advocate the use of paraffin injections for prosthetic purposes. The method was taken up by a good many skilled and well-recognised surgeons and rhinologists, but also by charlatans and "beauty doctors." As case reports of untoward results have come into the literature with unpleasant frequency in late years, its first burst of widespread popularity has waned considerably. Some of these untoward results are toxic absorption, inflammatory reactions, loss of tissue from sloughing, air and paraffin embolism, primary diffusion of paraffin into other tissues, interference with the alar muscles and consequent embarrassment of respiration, paraffin absorption with loss of cosmetic result attained, dermal hyperæmia and hypersensitiveness, and abscess formation. Retinitis, optic neuritis and sudden blindness have been reported. Oppenheimer holds that the paraffin method is dangerous, even in the hands of the well-equipped surgeon, and doubly dangerous in those of the "beauty doctor."

J. S. FRASER.

Pharyngo-Laryngeal Actinomycosis. G. FERRERI. (*Arch. Ital. di Laringologia*. Vol. xxxix., Nos. 1-2, Aug. 1919.)

Primary actinomycosis of the pharynx or larynx is comparatively rare. The author has only been able to collect one or two cases from the literature. He adds a description of a case which came under his notice during the War.

A sailor came to the clinic with a history of constant sore throats. For some weeks this had been getting worse, and finally there had been hoarseness and some difficulty in breathing.

On examination, the anterior and posterior pillars of the fauces on the right side were seen to be greatly thickened and to have a flattened, papillomatous appearance. This extended to the root of the tongue

Abstracts

and on to the tonsil, which was greatly enlarged and had cheesy matter exuding from the crypts. The disease extended down the right side of the root of the tongue to the glosso-epiglottic fold, the right ary-epiglottic fold and the arytenoid prominence. The right cord was fixed by the infiltration.

Treatment consisted in removing with forceps the greater part of the infiltrated areas and in the administration of iodine by hypodermic injections.

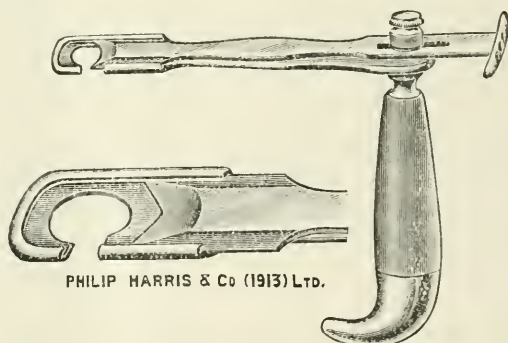
Sections of the tissue showed the typical histological appearance of actinomycosis, and the fungus was easily seen.

J. K. MILNE DICKIE.

GUILLOTINE WITH A LATERAL SLOT FOR SEVERING PEDICLE OF TONSIL ENUCLEATED BY DISSECTION.

By SEYMOUR JONES, Hon. Surgeon, Ear and Throat Hospital, Birmingham.

Tonsils completely dissected out from the tonsillar cleft remain attached by a fibrous prolongation to the side of the tongue. This is usually severed close to the tongue by passing a guillotine (French or English pattern) over a single traction forceps. Scissors are not satisfactory.



In the modified guillotine shown in the woodcut the slot in the side of the fenestrum allows the guillotine to slide around and engage the pedicle without detaching any of the traction forceps, even if two or three pairs are in use. The side of the fenestrum opposite the slot is reinforced.

Messrs Philip Harris & Co., Edmund Street, Birmingham, have carefully carried out the author's design and will supply it.



JAMES WALKER DOWNIE, M.B., C.M., F.R.F.P.S.G.



OBITUARY

JAMES WALKER DOWNIE, M.B., C.M., F.R.F.P.S.G.

By the death of Walker Downie on 21st July 1921, in his 66th year, the profession has lost one who for more than thirty years held a prominent place in our specialty. Born in Glasgow, educated at the High School and the University, he graduated in 1881, and after a course of study in London, he returned to his native city. For a time, as was not unusual in those days in Glasgow, he engaged in general practice, though devoting himself specially to the treatment of affections of the throat, nose, and ear. For several years he worked in the surgical wards of the Western Infirmary as assistant to the late Dr Patterson, an association to which Walker Downie often referred, and which, indeed, had a decided effect upon his surgical methods.

In 1888, Walker Downie was appointed to the charge of the Throat and Nose Department of the Western Infirmary. At that time there were no beds definitely set apart for the special branch, but, in 1916, two wards were allocated for that purpose and he became full Surgeon. In 1895, he received the newly-instituted Lectureship on Diseases of the Throat and Nose at the University. Previous to this he had conducted at the Western Medical School an extra-mural class, which was very popular both with students and graduates. During the whole period of the war he acted as specialist in connection with the 3rd Scottish General Hospital with the rank of Major R.A.M.C. (T.F.). He was also Surgeon for Diseases of the Ear, Nose, and Throat at the Royal Hospital for Sick Children, Glasgow.

His clinical manual on *Diseases of the Throat and Nose* reached a second edition, and found favour with his students, for whom it was primarily intended. Out of his large and rapidly increasing experience, hospital and private, he published many interesting reports of cases, and he made other contributions to the literature of the specialty. Probably those which had reference to the treatment of nasal deformities by the injection of paraffin-wax are most generally known. He was accepted as an authority on the subject, as he was one of the first, in this country at any rate, to use the method.

Walker Downie expressed himself tersely and forcibly both in speaking and writing, and he shone as a lecturer and teacher. Even before attendance on a course of instruction in Diseases of the Throat and Nose was compulsory for graduation purposes, as it is now in the Scottish Universities, his class was large. Indeed in this, as in the work of his department at the Western Infirmary, he put too great a tax on his time and on his health. He frequently expressed his regret

Obituary

that he was thereby prevented from attending, as often as he would have liked, the Laryngological Meetings in London. It was for this reason, and also because he was above everything a Scot, that he responded so readily to the suggestion for the formation of the Scottish Otological and Laryngological Society, in which he took a great interest. His love for and belief in Scotland, and especially Glasgow, was evident to anyone who associated with him. He knew the history of his city and of her sons. He was proud of her and even jealous for her. He was strongly attached to his University and to the Royal Faculty of Physicians and Surgeons in which he had held high office, and to which he presented a mace. Walker Downie had interests outside his profession. He was well versed in business affairs and would have made his mark in a commercial career. He was fond of sport—fishing and shooting—and of travel. He had, too, a love for and knowledge of Art.

About three years ago he had the misfortune to fracture his patella, and he was, in consequence, unable to carry on his work for a considerable time. The war brought him a double bereavement in the loss of his brother and of his only son. His former robust health became impaired and he began to suffer from attacks of angina pectoris. He spent the winter of 1919-20 in the south of France, and on his return appeared much improved in health. The anginous attacks, however, again manifested themselves, and he resigned his appointments at the Western Infirmary and at the University, though he still continued in private practice, against the advice of his doctor. It was quite in accord with his restless energy, mental and physical, that he could not contemplate complete retirement.

He is survived by his widow and daughter, to whom all his colleagues and friends desire to extend their sympathy.

W. S. SYME.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, W. 1.

Section of Otology—*President*, Dr A. Logan Turner. *Hon. Secretaries*, Mr Norman Patterson, F.R.C.S., and Mr F. J. Cleminson, M.Ch. The first Meeting of the Section will be held on Friday, 21st October, at 5 o'clock. Members desiring to show patients, specimens, and instruments should notify the Senior Hon. Secretary, Mr Norman Patterson, F.R.C.S., 16 Devonshire Place, London, W. 1, at least twelve days before the Meeting. Papers complete and ready for printing must be sent twenty-one days in advance.

Section of Laryngology—*President*, Sir William Milligan, M.D. *Hon. Secretaries*, Mr Walter G. Howarth, F.R.C.S., and Mr T. B. Layton, D.S.O., M.S. The first Meeting of the Section will be held on Friday, 4th November, at 4.45 o'clock. Members intending to show patients or specimens are asked to send notice to the Senior Hon. Secretary, Mr Walter G. Howarth, F.R.C.S., 75 Harley Street, London, W. 1, at least twelve days before the Meeting.

* * *

BRITISH MEDICAL ASSOCIATION, 1922.

The next Annual Meeting of the Association will be held in Glasgow, from the 25th to 29th July. It is certain to be a success in the commercial capital of Scotland and the second largest city in the Kingdom. It may be difficult to rival the very successful meeting recently concluded in Newcastle-upon-Tyne, but those who come north of the Tweed next year will be sure to receive what French friends regard as proverbial, viz.—“*l'hospitalité écossaise*.”

* * *

TENTH INTERNATIONAL CONGRESS OF OTOLGY.

The two following subjects have been selected for discussion at the forthcoming Congress in Paris, in July 1922 :—

(1) The Influence of Chronic Nasal Obstruction upon Adhesive Middle Ear Catarrh in the Adult.

(2) The Diagnosis and Treatment of Inflammatory Conditions in the Cerebellar Fossa (extra-dural abscess, serous meningitis, sub-dural abscess, and cerebellar abscess).

General Notes

ARCHIVES INTERNATIONALES DE LARYNGOLOGIE, D'OTOLOGIE,
ET DE RHINOLOGIE.

We are very pleased to learn that this Journal is now under the direction of Dr Fernand Lemaitre, assisted by Dr Baldenweck. The new editor announces that he desires to preserve the two chief features of the magazine, viz., its truly international character and its very complete bibliography. Dr Lemaitre is one of the few men who has gained the title of "Oto-laryngologist to the Hospitals of Paris"; he has many friends both in this country and in America, and his undertaking will be welcomed by his English-speaking colleagues.

* * *

We are glad to record that the well-known Journal *Les Annales des Maladies de l'Oreille, du Larynx, du Nez et du Pharynx*, which, during the war, was obliged to suspend publication, is to reappear in January 1922 under the direction of Drs Lermoyez, Sébilleau, Lannois, Jacques, Mouret, Georges Laurens, Bourgeois, and Escat. Dr A. Hautant will act as Editor.

* * *

The Semon Lecture was delivered on 5th July by Dr W. Jobson Horne, the President of the Section of Laryngology, Royal Society of Medicine. The subject of the lecture was "The Relationship of the Larynx to Pulmonary Tuberculosis."

* * *

We congratulate Sir St Clair Thomson on having received the Order of Chevalier de la Légion d'Honneur for his services rendered in France with the Croix Rouge Française during the war.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

NASAL SINUSITIS IN CHILDREN.*

By F. J. CLEMINSON, M.Ch. (Cantab.), F.R.C.S. (Eng.), Aural Surgeon to the Evelina Hospital for Children; Assistant Surgeon to the Throat Hospital, Golden Square; and Clinical Assistant in the Ear and Throat Department, Middlesex Hospital.

IN England this subject has attracted curiously little attention, although recently a number of workers, notably Dean,¹ have been studying it in America. The standard text-books on Diseases of Children deal with the causes of chronic rhinitis but make no mention of sinusitis. Even in the second edition of St Clair Thomson's well-known text-book sinusitis in children is dismissed in half a line as being "rare." The present paper is based on the study of 85 cases. The sinus chiefly considered is the maxillary antrum, although some of the cases showed ethmoiditis and a few also frontal and sphenoidal infection. The age of the children varies from 3 years (2 cases) and 4 years (8 cases) to 14 years (4 cases). One case of 15 and one of 16 years of age have also been included.

The series has been divided into four groups as follows: Group 1—In which tonsils and adenoids, or in a few cases adenoids only, had been removed before they came under my observation: total number 27; average age 10.5 years. Group 2—In which tonsils and adenoids or adenoids only were removed while under observation: total 25; average age 8.6 years. Group 3—In which these structures have not been removed, though a number are waiting for operation: total 27; average

* A paper read before the Section of Otology, Royal Society of Medicine, 20th May 1921.

F. J. Cleminson

age 8.0 years. Group 4—Finally, there are 6 cases of which my notes fail to give particulars in this respect. Average age 10.1 years.

The symptoms complained of and the signs observed have been analysed with care, and from them it has been possible to build up a picture toward which the average case tends to approximate, and which is an almost exact portrait of a certain number of the more typical cases. In descending order of frequency the symptoms are:—running from the nose, nasal obstruction, constant colds, deafness, chronic cough, frontal or supraorbital headache, mental dulness and lethargy, and, very occasionally nose-bleeding, pains in the face or teeth, and pains in the joints. Also in descending order of frequency the signs observed are:—pus or muco-pus or a clear watery fluid in one or both sides of the nose, thickening and perhaps reddening of the nostrils (which are sometimes excoriated), congestion of the turbinals, and sometimes a traumatic deflection of the septum. Quite frequently the anterior end of the middle turbinal on one or both sides seems to be gripped firmly between the septum and the outer wall of the nose. Otorrhœa may be present in one or both ears. Two of the cases showed chorea, and one bilateral epiphora. The complexion may be sallow or show a bluish purple tint, the former type showing sometimes a dark patch under each eye. The hands may be blue and cold, and the facial expression dull and vacant. The child shows little or no energy.

It must be emphasised that a child exhibiting all these symptoms and signs is rare. The picture must be looked upon as a composite photograph of the more typical cases.

Diagnosis rests on the symptoms and signs, on the results of transillumination, radiography, and exploratory puncture. Transillumination in children is not a sure guide. In normal cases in the youngest children the inner horn only of the infraocular crescent lights up, though as the years advance the zone of illumination extends until in older children the crescent is complete; in other words, the bright area conforms to the relative size of the antrum and orbit. In noting the results of the test it has been found convenient to use a series of numerals, 0 representing absolute clarity, and 5 absolute darkness. The advantage of this method is that progress can be more accurately tested and recorded.

As a general rule the next step has been to have a radiogram

Nasal Sinusitis in Children

of the face taken in the antero-posterior position. Experience is needed in the interpretation, especially where the condition is symmetrical. The radiogram is the more valuable the greater the difference in transparency of the two sides. Muco-pus has frequently been found in fair quantity in antra which were equally dark or bright to transillumination, of an identical degree of opacity in the radiogram which to a skilled radiographer yielded no evidence of disease. The plate also gives useful information on the condition of the ethmoids and the frontal sinuses, which latter do not, as a rule, begin to develop before the eighth year. In some plates the sphenoidal sinuses can be made out.

The final stage in the diagnosis is exploratory puncture. In children under seven ethyl chloride or gas is given for this, but over that age local anæsthesia alone is used. The needle is passed under the inferior turbinate and through the antromeat wall in the usual way. Next, the nostrils are syringed through to clear the nose and post-nasal space of discharge. An inner cannula with record syringe attached is then passed through the exploring cannula and a few c.c. of normal saline thrown into the antrum and sucked backwards and forwards two or three times, and afterwards sent to the pathologist for examination by smear and culture. Lastly, the rubber syringe is fitted to the outer cannula and the antrum thoroughly washed out by a stream of mingled air and saline, and a note is made at once of the character of the washing. Children readily tolerate the whole procedure once it has been carefully explained to them before each stage.

The material washed out varies from an almost clear fluid in which there are a few threads or shreds of pus or muco-pus, to a large clot which must practically have filled the antrum, and has the appearance of custard. In some cases a glairy mucoid cast of the antrum appears, which may or may not have a few nuclei of muco-pus imbedded in it. In other cases a turbid fluid is obtained containing long interwoven threads of muco-pus, sometimes arranged in a pattern resembling a wreath. Now and again a clot hangs in the ostium of the antrum and is expelled only after a minute or two of steadily maintained pressure. After its expulsion the return flow becomes easy. Sometimes no return flow at all can be obtained, though at the next sitting clots may be washed out quite easily, the probable explanation being that on the first occasion the orifice

F. J. Cleminson

was blocked by an exceptionally large and stubborn clot. One case of rather special interest may be quoted in this connection.

In a girl of 8 the two sides were equally dark to X-rays, while on transillumination the left side was found to be the brighter. From the latter side on puncture a clear straw coloured fluid dripped under pressure, much as may occur on lumbar puncture, but no return flow could be obtained on attempting to wash through the antrum. The fluid which had dripped out was sent to the pathologist and found to be sterile, and to deposit an albuminous clot. The antrum probably contained a cyst and is to be opened later on. The right antrum in the same case contained pus which yielded a diphtheroid bacillus, stated *not* to be the Klebs-Loeffler bacillus. Now the history of the discharge from this side of the nose dates back quite definitely to an attack of diphtheria three years ago, suggesting the possibility of the sinuses of the nose acting as diphtheria-carriers. (The question whether micro-organisms may undergo metamorphosis while living for long periods in the same habitat is also raised.) Curiously enough the right antrum cleared up after two punctures and there has been no recurrence of symptoms so far, though translucency to light has been only partly re-established.

It is not always easy to guide the point of the trocar into the antrum in the very young, as the thin-walled area is so small. In one or two of the earlier cases the trocar passed into the cheek, grazing the margin of the pyriform opening without entering the antrum at all. In such a case the trocar can be palpated through the cheek, and no harm follows its withdrawal.

Bacteriology.—In 15 cases a single variety of organism only was found: in 8 pneumococci, in 4 streptococci, and in the remaining 3 the micrococcus catarrhalis in one, the Bacillus influenzae in one, and the Bacillus mucosus ozaenae in one. In the other cases examined, the infection was multiple, the figures being m. catarrhalis in 18, pneumococci in 17, streptococci in 7, B. influenzae in 6, saphrophytic organisms in 4, and diphtheroid bacilli in 2.

For various reasons by no means every case has been submitted to bacteriological examination, so that the series is too short for any useful deduction to be made as to the influence of the nature of the organism on the prognosis or on the character of the discharge from the antrum.

Treatment.—The methods adopted have been as follows. Once the diagnosis has been established by puncture a close watch is kept on the leading signs and symptoms; in a number

Nasal Sinusitis in Children

of cases these have been extraordinarily relieved by a single puncture, and have not recurred over periods of weeks or months. Such cases have in a very tentative way been regarded as cured, though, of course, it must be recognised that they are liable to recurrence after an attack of coryza or influenza, since in these noses there must be some anatomical peculiarity rendering them especially liable to sinus disease, such as a "crowded" middle turbinal, or an unduly small antral ostium. Many children have had more than one puncture done, sometimes in the end with the same gratifying result, or on the other hand only with improvement—an improvement moreover maintained only so long as treatment by puncture and irrigation is continued. In other cases there has been no change to record. Some of the two latter classes have already had their antra drained into the nose, while others are on the "waiting list."

Some children in whom the diagnosis has been carried as far as the stage before puncture, but in whom this procedure has not been carried out, have been treated by local medication, such as has been used in the other cases as an adjuvant to puncture. They have been given an alkaline lotion to be used night and morning, followed by an antiseptic oil or ointment to be applied to the interior of the nares. An especially useful oil contains menthol, gr. 5, camphor, gr. 2, and ol. cinnam., m. 2, to the ounce of liquid paraffin. This tends temporarily to open up the congested spaces in the nose and so to promote natural drainage. Such treatment has rarely been effective in the absence of puncture. One case may be quoted to the contrary, however, which is not included in the series.

A girl aged 5 years was liable to severe recurrent pneumococcal rhinitis, following a "cold." I saw her first two years ago, before realising that the sinuses in a child so young could be seriously infected. She had had her tonsils and adenoids thoroughly removed at the age of two; she lives in good surroundings, and is carefully tended. In her case the effect of palliative treatment was to clear up all the symptoms in a few weeks, and to leave her free from nasal trouble till the next attack. During the last of these, about three months ago, she was X-rayed, and the picture showed both antra opaque. She has again cleared up without puncture.

The severity of her attacks, as compared with what is seen in similar cases among children of the hospital class, whose tonsils and adenoids are still *in situ*, caused one to wonder

F. J. Cleminson

whether it may be possible that the tonsils and adenoids, in her case completely absent, may have some protective function in preventing a systemic spread, though at the cost of their own inflammation and enlargement. In one or two hospital cases where the mother has been an unusually intelligent observer, the following sequence has been described: first, a cold, then a supraorbital headache (probably pointing to involvement of the antra), and finally a sore throat with swelling of the tonsils, followed by enlargement of the glands in the neck. This suggests that sometimes at any rate, the sinuses are affected first and the tonsils become inflamed secondarily to them. The liability of the adult tonsil to acute inflammation is well recognised after such intranasal interference as the cauterisation of the inferior turbinal. Against this view of the relation between the tonsil and the antrum is the recent experimental work by Mullin and Ryder,² who find in rabbits that the antra drain first into the submaxillary lymph glands and thence into the upper deep cervical group, missing the tonsils altogether. Dean has found some of his cases clear up after removal of the tonsils—cases which had previously failed to respond to treatment including even the removal of adenoids. It is fair to add that this applies only to cleft palate cases, where of course the tonsillar infection has special facilities for spreading into the nose. At first my own attitude in this work was to leave the tonsils and adenoids alone where they still existed and to concentrate on the treatment of the sinuses, but since reading Dean's paper I have been more inclined to remove both tonsils and adenoids as part of the treatment. The cases so treated are too few and too recent to allow of any conclusion as to comparative results. Where there is a large adenoid mass present it has always been removed, because septic adenoids and infected sinuses must play into each other's hands by maintaining intranasal congestion and so hindering natural drainage.

The residue of cases which do not clear up after removal of tonsils and adenoids can probably be treated most effectively by the operation of intranasal antrostomy. Where the middle turbinal is so jammed as to obstruct the ostia under its shelter a small piece of the anterior end may be removed, and this can be done at the same time as the tonsils and adenoids, in the hope of avoiding any further necessity for operative interference. The antra have been opened intranasally in 8 cases, and in each case the anterior third or half of the more dependent

Nasal Sinusitis in Children

portion only of the inferior turbinate has been removed as well, because lavage and drainage are both rendered easier thereby. The results so far have been excellent.

The results of treatment in the present series are :—complete relief of symptoms in 22 per cent., improvement in 39 per cent., and no change in 23 per cent. The remaining 16 per cent. have passed from observation for various reasons. The percentage showing no change is highest in the group in which tonsils and adenoids had been removed before the children came under my observation. This is natural because this group contains none of those cases in which the sinuses clear up after this operation. The effect on the various symptoms of successful or temporarily successful treatment is most gratifying, and such as to leave no doubt in the mind of the observer that the affection of the sinuses has been at any rate in large part responsible for the ill-health which has brought the children to the clinics. The nasal discharge ceases and the congestion of the mucosa diminishes or disappears so that nasal respiration is re-established. Headaches lessen or vanish and complexions improve, a look of health replacing the toxic and dull appearance. The parents often notice a decided improvement in mentality. Again, one parent stated this was the first winter he could remember in which his daughter had been without a cough. (The girl's antrum had been drained intranasally.)

The question of Otorrhœa and Deafness demands special consideration. There were 9 cases of *deafness without discharge*. The results may be tabulated as follows : *

Group.	Improved.	Doubtful.	No Change.
1	2	...	...
2	1	2	...
3	3	...	1
Totals	6	2	1

Otorrhœa existed on one or both sides in 8 cases belonging to Group 1. Three showed no change (though it ought to be stated that in 2 of these, sinus treatment had only just been instituted). Of the others 1 ceased discharging after, and 2 before, sinus treatment had been begun. The remaining 2 improved. In the second group there were 4 cases, 1 being bilateral. In all, the discharge has ceased (in 1 case before sinus treatment had been commenced). Group 3 provides 3

* For groups here referred to see page 505.

F. J. Cleminson

cases in 2 of which the discharge has ceased (1 before sinus treatment), while the third shows no change. In other words, out of 15 cases the discharge has stopped in 9, 2 show improvement, and in 4 there is no change.

In every case routine local treatment of the ear was of course carried out (by the parents) from the first. Clearly in these ear cases the results have been by no means brilliant, no better perhaps than if there had been no sinus treatment at all; but the number dealt with has been so small and the treatment often of such short duration that the results can scarcely be claimed as a real indication, one way or the other, of the value in the treatment of deafness and otorrhœa of the attempt to eliminate foci of infection in the nose. When the basis of investigation has been broadened, results more worthy of attention will be obtained.

Treatment by vaccines has not been tried as yet, but will be instituted shortly in certain cases and reported on later.

Prognosis.—The bulk of the cases showed only a mild degree of inflammation, as shown by the symptoms and the character of the washings. But there are 7 cases of advanced disease among the older children, which seem to indicate what may happen to some of the mild cases if they are neglected during childhood. One case may be selected as fairly typical of the rest.

A girl 13 years old, had lived in the country all her life. During the whole of her school life she has complained of bad frontal headaches, and the mother stated that the girl had always been dull and heavy, and took so little interest in anything "that I always felt she had something missing." Tonsils and adenoids were still present. Her skin was unhealthy, and the expression of her face bore out her mother's description. Pus was seen in both sides of the nose, and both antra were absolutely dark to transillumination and to the X-rays. Each antrum was washed out twice during January of this year and yielded abundant pus. Headache diminished and health improved but the pus reaccumulated, and in February both antra were opened intranasally. A month later her mother said that the girl appeared "much sharper," and two months after the operation she came up rosy-cheeked and healthy looking, with a clear alert eye, and reporting complete absence of headaches. The nose is now practically clean, and the general improvement has persisted.

It has not been altogether easy in this series to distinguish the acute from the chronic or sub-acute case, though the history

Nasal Sinusitis in Children

may be very suggestive. I am inclined to think that those cases which cleared up rapidly after one or two punctures belong probably to the group of recent infections.

One probable cause of the lack of attention which the sinuses have received in young children as a subject for systematic study, is the great similarity between the clinical picture produced by sinus disease and that painted in almost every text-book as due to adenoid hypertrophy and infection. No doubt many features are common to both, but I think it may be possible in the future to segregate certain symptoms as being especially characteristic of sinus disease, and absent from what may be called a purely adenoid case. Headache, for instance, persistently complained of in the frontal region, especially if unilateral, should direct attention to the nose rather than to the post-nasal space.

In this work, which is still being carried on, I feel that the fringe has barely been touched, and it is much to be hoped that in the future the subject will attract the increasing and careful attention of many observers. I am fully prepared to have two-thirds or even three-quarters of these cases explained away by doubting critics, if I am fortunate enough to attract their attention. I am fully convinced, however, that there is a residuum which is unassailable, and if these have come within the experience of a single observer during a few short months, it must mean that the total number of such cases scattered up and down the country is very considerable and that the resultant amount of ill-health, which may last throughout life, is so large as to make it well worth while for each of us to keep an open mind and eye in order that sinus disease may be placed in its true perspective among the diseases of children, and the best methods found for its relief and cure.

The investigation has been carried on at the Evelina Hospital for Children, the Throat Hospital (Golden Square), and the Middlesex Hospital, and I must express my most grateful acknowledgments to my seniors and colleagues, and more especially to the radiographers and pathologists at these hospitals for the willing and able co-operation which has made the work possible.

REFERENCES.—¹ Annual 29th Meeting, *Amer. Laryng. Rhin. and Otol. Soc.*, 1919. ² *Laryngoscope*, March 1921.

EXPERIENCES OF AN OTOLOGIST IN FRANCE, 1915-1919.

By J. K. MILNE DICKIE, M.D., F.R.C.S. Edin., Ottawa, Canada.

IN the following paper I propose to give an account of the ear, nose, and throat conditions which came under my care while on active service in France from 1915 to 1919. A fair number of these were seen while at 26 General Hospital, Etaples, some at 7 General Hospital, St Omer, but the great majority were seen after my appointment, in 1918, as otologist to the Second Army.

The class of case met with resembled closely that of the out-patient clinics of peace time. Very few war injuries came under my observation. This is explained by the fact that in 1918 the actual battle zone was too far off, and the Ear Centre was not in the direct line of evacuation. The effects of mustard gas poisoning were not met with either, as during the summer and autumn of 1918 the movements of the troops were too active for the effective use of gas. During the winter 1917-18, as battalion medical officer I had many cases in my unit during the end of the fighting in Flanders, in the Houthulst Forest and Passchendaele sectors, but at that time I had no means of examining the larynx. In this area gas lesions were met with in the form of intractable skin burns, and in the respiratory system in the form of loss of voice. At one time about a quarter of the regiment was affected in this way.

My notes of 1415 cases contain some very interesting material. A statistical analysis demonstrates the relative frequency of some conditions and the rarity of others, as contrasted with figures from civil practice. In military work affections of the ear far outweighed nose and throat lesions both in frequency and importance. Thus, in my series there were 1209 pathological ear findings as compared with 775 pathological conditions of the nose, naso-pharynx, and throat, a ratio of 1 to 0.64. If one compares these figures with those taken from an average out-patient clinic, such as the Ear, Nose, and Throat Department of the Royal Infirmary, Edinburgh, one finds a marked difference. Thus, in the Royal Infirmary during these years, there were 5382 ear affections as compared with 10,627 nose, throat, and laryngeal cases, a ratio of 1 to 1.97, a large proportion of the 10,627 being cases of tonsils and

Experiences of an Otologist in France

adenoids (3597), which in a civil clinic occur mostly in children. After deducting the tonsil and adenoid cases there are still 7030 nose and throat conditions, so that the proportion of the ear cases is still 1 to 1.3, which means that in the army the proportion of ear cases is almost double what it is in civil practice.

TABLE OF COMPLAINTS AND DISEASES.

COMPLAINTS.

Deafness	558	Nasal Discharge	47
Ear discharge	651	Headache	65
Pain in ear	259	Nasal Bleeding	15
Subjective noises	128	Sore throat	118
Vertigo	43	Hoarseness	25
Nasal obstruction	103	Loss of voice	43
Colds	53	Cough	13

PATHOLOGICAL CONDITIONS.

Wax	105	Deviated septum	176
Ot. ext. : boil, etc.	176	Nasal polypi	11
Acute middle ear catarrh	41	Acute antrum suppuration	4
Chronic middle ear catarrh	113	Chronic antrum suppuration	5
Otosclerosis	23	Acute frontal sinusitis	13
Acute middle ear suppuration	74	Mixed sinusitis	2
Chronic middle ear suppuration	398	Atrophic rhinitis	12
Mastoiditis	27	Foreign body in nose	4
Labyrinthitis	3	Adenoids	183
Intracranial complication	3	Acute tonsillitis	31
Results of otitis media	122	Chronic tonsillitis	95
Nerve deafness	28	Pharyngitis	37
Gun deafness, etc.	26	Laryngitis	52
Ear polypi	77	Vocal nodule	4
Purulent rhinitis	27	Functional aphonia	15
Hypertrophic rhinitis	86	Negative examination	47
		Malingering	9

With regard to the symptoms, a glance at the accompanying table will show that discharging ears were the commonest condition for which advice or treatment was sought, while deafness, as a symptom, took the second place. Pain, subjective noises, and vertigo were much less frequent. The most common nasal symptom was obstruction and the most common throat symptom was acute or chronic sore throat. Of the pathological conditions found, chronic middle ear suppuration heads the list, followed by otitis externa, results of otitis media, chronic middle ear catarrh, and wax. It will be noticed that otitis externa, under

J. K. Milne Dickie

which heading are grouped boils, diffuse inflammation of the meatus, eczema, and impetigo, occupies a relatively high place. Thus, in the Royal Infirmary figures already quoted, there were only 261 cases of otitis externa as compared with 4053 middle ear conditions (1 to 15.5). In my series the corresponding figures are 176 to 805 (1 to 4.5).

In the earlier years of the war contagious skin diseases, such as impetigo, were rife owing to the absence of organised attempts to deal with the problem of vermin. In 1915 and 1916, cases of severe impetigo of the ear were very common. In the later years of the war, however, these were not seen. Furunculosis of the ear was fairly common, as were also boils on other parts of the body. The extensive use of tinned foods, bad water, and difficulty in keeping clean may perhaps account for them.

A large part of my work was medico-legal. Soldiers were sent down to the Centre for a report on their hearing. In my experience, malingerer pure and simple was rare. By the term malingerer I mean a person with no lesion who deliberately simulates some disability. On the other hand, most of the deaf patients whom I saw exaggerated to a certain extent their real deafness. To determine the exact degree of deafness was not of capital importance, but one had to determine it within certain limits. It was necessary to know whether a man could hear well enough for front line duty, or if not, whether he was fit for military duty of any sort.

I do not propose to describe in detail the various tests employed. It will suffice to say that they can be divided into three classes: (1) tests of sincerity, (2) reflexes, (3) tests requiring co-operation. The latter were only satisfactory when the patient was sincere. They include tuning-fork tests and quantitative hearing tests.

Deafness and Fitness for Military Service.

In the French Army the minimum hearing requirements for armed service are whisper at 50 cm. or ordinary voice at 4 to 5 m. (15 feet). For the auxiliary services a quarter of the above hearing distances are required. Anything less than that entitles to exemption or discharge. Cases with caries and polypus formation, or cases with cholesteatoma or attic suppuration are exempted if they are not improved by treatment.

In the German Army the minimum requirements for active

Experiences of an Otologist in France

service are a unilateral defect of not less than whisper at one metre. For the auxiliary services a hearing distance is required of whisper at one metre if bilateral, or if unilateral, hearing of less than one metre is accepted when the other ear is normal.

In the Italian Army similarly the standard for hearing is whisper at one metre.

During the recent war the demand for men was so great that the standards of recruiting were considerably lowered. It was found by experience that men could make good soldiers even if they had some physical defect which would formerly have exempted them altogether. It may be taken as a good general rule that, in the case of unilateral deafness, the hearing for front line service should be not less than whisper at 3 feet, and ordinary voice at about 10 feet in the deaf ear. If the deafness is bilateral, whisper should be heard at 6 feet and voice at 15 feet. For class B, total deafness on one side may be allowed if the other ear is normal. In bilateral deafness ordinary voice should be heard at 6 feet.

With regard to the fitness of patients with chronic middle ear suppuration hard and fast rules cannot be laid down. In such circumstances as obtained during the late war in France and Belgium, where medical attention and hospital treatment were always available, many men could be taken for service with old-standing middle ear suppuration without much risk. However, large numbers of men with chronic middle ear suppuration were sent on front line service who should have been either kept at home or on the lines of communication. Active service aggravated the condition and serious complications were liable to supervene. If these complications were immediately recognised, the matter would not be of such great importance, but it is our experience that lateral sinus thrombosis, extradural abscess, labyrinthitis, brain abscess, etc., were not generally recognised until too late. Those soldiers who were unfortunate enough to have chronic middle ear suppuration with caries, were subjected to risks which might have been avoided. It may be argued that these men were exposed to death by enemy action in any case, but while such accidents are unavoidable from the nature of military operations, deaths attributable to neglect of chronic diseases should not occur. The kind of case that is dangerous is that with granulations and polypi where drainage is insufficient. Cholesteatoma in

J. K. Milne Dickie

the attic is particularly dangerous. Cases with a large perforation and little discharge are fit, provided their hearing is up to the standard.

The disposal of chronic middle ear suppuration cases during the war was a great problem. The wastage from this cause alone was enormous. Numbers of soldiers running into thousands were constantly going from hospital to convalescent camp and back to hospital again, sometimes for months at a time and receiving little or no treatment and performing no useful work. Many were classed as P.B., but the numbers of P.B. men were so great that it was difficult to keep them usefully employed. It would have been much wiser to have discharged many and have put them to munition making, for which they were perfectly fit, or to have made them resume their civil employment, where in all probability they would at least be self-supporting, and not an additional burden on the public purse. A ruthless comb out of the fit men in the munition factories would probably have yielded large numbers of useful men to take their place.

It is a fact greatly to be regretted that Oto-Laryngology was not officially recognised in the British Army as a specialty during the war. It was not till the later stages of the war that special centres for ear cases were created and put in charge of recognised otologists. This was done only after great insistence by the various consultants to the armies, and even then the equipment and organisation were very inadequate. Neurological and eye cases could be sent to special hospitals at the base or in England, where expert service could be obtained. Serious ear cases, on the other hand, were very often sent to some small country hospital, where they received no treatment by specialists, with the result that their healing was delayed indefinitely.

It is to be hoped that if we are ever unfortunate enough to be again drawn into a conflict like the late war we may have an efficient organisation for the treatment of ear cases, which could begin to function immediately. This is only possible if some representative body of specialists will insist on the proper recognition of the specialty by the army medical authorities, and will work out a scheme by which otologists should be stationed in various easily accessible hospitals, so that any patient requiring special treatment could get it. Ear cases, when sent to the base, should always be sent to an otological

Experiences of an Otologist in France

centre, so that the results of any previous treatment should not be spoiled through neglect.

At the Second Army Ear Centre we took into hospital for treatment all acute ear conditions, *e.g.*, boils, acute middle ear catarrh and suppuration, mastoiditis, etc., and those chronic cases which were likely to show rapid improvement. Aural polypi were removed and the ears treated with syringing and medicated drops. In some instances intratympanic syringing was used with beneficial results. Most of these men were returned to their units with the ears dry and the hearing improved. Others did not dry up entirely, but with few exceptions were sufficiently improved to return to their units.

In the matter of operative treatment, it was felt that the radical mastoid operation should not be performed unless the indications were very strong, such as pain, or other signs of impending danger. The radical mastoid was very unsatisfactory in military practice, as it was rarely possible for the operator to supervise treatment till its completion. This was possible only at the base or in England. We performed such operations, therefore, only in cases of urgency. Wertheim of Breslau¹ collected 100 radical mastoids operated on during the war by various surgeons. He found that in 48 of them the ear was still discharging and there was no question of cure. In 51, the ear was practically totally deaf (whisper at less than $\frac{1}{4}$ metre). In 80 per cent. whisper was heard at not more than 1 metre. These results are not to be compared with those obtained in civil practice, where the operation is fairly satisfactory. In a series reported by J. S. Fraser and myself,² 85 per cent. were dry. As regards hearing 68 per cent. were improved, 18 per cent. remained the same, and in 13 per cent. the hearing was diminished. In the series of Fraser and Garretson³ 50 per cent. were perfectly dry and free from discharge, adding cases slightly moist but not discharging, a percentage of 66 was obtained. The hearing in the majority of cases was slightly improved, but even before operation it was generally extremely poor.

Again, when a perfect cure results from the operation the duration of convalescence is so long that, from the military point of view, the time spent does not compensate for the possible slight increase in efficiency of the soldier. We were not so much concerned with the ultimate health of the patient

J. K. Milne Dickie

as with his immediate future, for it must be remembered that the primary function of the medical service in war time is to keep the ranks full.

In the French Army, where there were large otological services, a considerable number of operations were done on selected cases with the idea of rendering men permanently fit in that respect and returning them to the line. These operations were mostly of the modified radical type of Heath or Bondy in cases of attic suppuration with good hearing. A cure was obtained in 50 to 70 days.⁴ Conditions in the French Army were more favourable for this kind of treatment, as the patients could be kept under observation by the surgeon till the treatment was completed.

A healed radical mastoid is no bar to military service provided that the hearing is normal in the other ear. Fourteen old radical mastoids and two modified radicals were seen by me at the Centre. Their operations dated from 1 to 12 years previously. The average period was 4.7 years. Of these 16 cases, 6 were clean and dry, 2 contained wax but were otherwise clean, while 8 contained pus and granulations. The hearing was noted in 7 cases. In one dry case whisper was heard at 9 feet, but in the rest ordinary voice was heard at less than 2 feet, and in the majority of these only at the ear. That is to say, in 6 out of 7 the ear was functionally useless. In the army we would naturally come across those cases with the poorest results, so that these probably do not give a fair impression, and besides, the general conditions of active service, with bombardments and other forms of annoyance, would all tend to aggravate the existing deafness.

Among my cases of chronic otitis media there were 18 cases of attic suppuration with perforation of Shrapnell's membrane. Of these, 3 had dried up. Headache or pain in the ear were noted in only 5. The hearing varied from ordinary voice (CV) 3 inches to 15 feet. The average distance was a little over 5½ feet. All these cases were treated by conservative methods. Syringing followed by instillation of either H₂O₂, or alcohol was used in all, and in some, lavage with an intratympanic cannula. Good results were obtained by these means. In one instance large masses of cholesteatoma were washed out, after which the ear dried up completely.

The following case of attic suppuration is not included in the above numbers, as the perforation was not in Shrapnell's

Experiences of an Otologist in France

membrane but in the posterior part of the drum membrane proper:—

Pte. W., admitted 3/10/18 with a history of discharge from the right ear for a year. His ear had discharged previously for some time. He had had a feeling of stiffness and weakness of the right side of the face for three months. He had pretty constant headache on the right side. Examination showed copious purulent discharge in the right ear with posterior perforation and polypus. The left drumhead was atrophic. Air bubbled through the perforation on autoinflation. There was some drooping of the right side of the mouth. There was nothing to note in the nose or throat. Whisper was heard at 14 feet in both ears. The polypus was removed from the right ear, and after removal a probe could be passed into the attic.

7/10/18—Still copious discharge of pus; caloric test R. produced horizontal and rotatory nystagmus to L. in 20 sec.; pneumatic test negative. 12/10/18—Pus more copious; hearing worse (whisper 11 feet); weakness of face more marked. 26/10/18—As there was no improvement in the amount of discharge or headache, and the facial paresis was becoming more marked, operation was decided on. Modified radical operation was performed: cortex sclerosed; antrum contained pus and cholesteatoma. Aditus and antrum were opened up and the bridge was pared down very fine and removed without disturbing the membrane or ossicles. Meatal flap cut and cavity packed. 3/11/18—Tube patent to-day; air can be blown through and fluid syringed through to throat. 18/11/18—Cavity almost dry now. Whisper heard at 14 feet. 22/11/18—Face much improved; ear nearly dry. Patient evacuated to base.

Gun and Concussion Deafness.

In this class are grouped, firstly, those who complained of deafness due to a definite explosion of shell, bomb, etc., and secondly, those who were becoming gradually deaf from continued exposure to loud noises. Very large numbers of patients complained of deafness which they attributed to the noise of the guns. However, on examination they were generally found to be suffering from a very chronic middle ear suppuration. It is, of course, probable that some increase in deafness is likely to result when a patient with a large perforation of the drum is repeatedly exposed to heavy concussions, as in firing heavy artillery. It was very common in gunners to get a history of previous otitis media which had dried up but had come back when on duty with the guns. It is reasonable to suppose that

J. K. Milne Dickie

a cicatrix would be very liable to be ruptured by the shock of the firing of heavy guns, as the concussion wave from the discharge of most of the heavy howitzers and the long range guns is enough to blow out a candle one hundred or more yards away.

Of my cases, there were 26 in whom the deafness was wholly or partly due to gun fire or shell explosion. Of these 26, 16 attributed their deafness to single shell commotion. The second group of 10 had been affected by continuous loud noises and were for the most part gunners. Six cases were probably psychic deafness. Two of these were apparently absolutely deaf, and two others almost totally deaf. The vestibular reactions were normal. It was very difficult to decide here whether we were dealing with malingering or hysteria. Such cases are very difficult to treat by suggestion on account of the difficulty of approach. The general opinion of those with extensive experience of such cases is, that absolute deafness is generally functional. It is unlikely that a shock, which leaves the vestibule unaffected, is, at the same time, severe enough to cause total destruction of the cochlea.

In most of the cases of the second group, that is those exposed to continuous loud noises, there was shortened bone conduction and a positive Rinne test. It must, however, be noted that the tuning-fork results must be accepted with reserve, as it is natural for a person who has something to gain by appearing to be deaf to give answers which form a fairly typical picture of nerve deafness. However, four showed hæmatomata of the drum and two others some delay in the response to the caloric reaction on the affected side. Blumenthal⁵ found in patients with healed gunshot wounds of the head that the hearing was affected in 50 per cent. Bone conduction was shortened in 91.8 per cent.; but this shortening was only partly in proportion to the degree of deafness, and was found in 84 per cent. of cases with normal hearing.

With regard to the pathology of labyrinth commotion, it has been shown experimentally by Prenant and Castex⁶ in guinea-pigs and rabbits that explosions caused dislocations of the cells of Corti, especially in the basal coil, hæmorrhages into the scala tympani, degeneration of the cells of the spiral ganglion, and ascending degeneration of the cochlear nerve. The vestibular organs were unaffected. J. S. Fraser and J. Fraser⁷ have shown that in warfare injuries to the ear hæmorrhages take

Experiences of an Otologist in France

place in the middle ear, cochlea, and internal meatus. In this connection I would like to bring up a point which bears on the mechanism of such injuries. While on duty in a small town in France, which received considerable attention from enemy aviators, I had ample opportunities for observing the effects of high explosives on buildings. It was a striking fact that when bombs had exploded in a street the window glass and even the shutters of the houses were burst *outwards*, except in those instances where an actual missile passed through the windows. Apparently there is a sudden wave of negative pressure following the explosion. It is reasonable to suppose that the effect of this negative pressure on the ear would be to cause a rupture of the smaller vessels.

With regard to the pathology of noise and occupational deafness, it was shown many years ago experimentally by Wittmaack, Siebenmann, Yoshii, and others, that prolonged exposure to loud noises of a constant pitch caused degeneration of the end-organs in certain parts of the cochlea corresponding to the pitch of the sound. Low pitched tones affected the apical coil, high pitched tones the basal coil, and medium pitched tones the middle coil. Rodger⁸ showed that boiler-maker's deafness in the earlier stages showed a defect only in that part of the tone scale which corresponded with the prevailing loud noises. Later, the deafness spread up and down the scale. Wittmaack⁹ in a subsequent paper found experimentally that the lesions caused by air-conducted sounds remained stationary and did not spread, but that the progressive deafness was due to vibrations conducted from the floor through the bones. This produced a degeneration in a part of the cochlea different from that affected by the air-conducted sounds.

I saw so few cases of rupture of the drum membrane that no conclusions could be drawn from them.

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THE VESTIBULAR REACTIONS IN DEAF-MUTES.

By GAVIN YOUNG, M.C., M.B., Ch.B., F.R.F.P.S.G., Assistant Surgeon, Throat and Nose Department, Western Infirmary, Glasgow ; Extra Assistant Surgeon, Glasgow Ear and Throat Hospital ; Rhinologist to the Glasgow Eye Infirmary.

THE following investigations were carried out in the summer of 1920, in the hope that the results might assist in furthering the classification of deaf-mutism. As the tests will show, however, there was no class which gave results peculiar to itself. Although the victims of hereditary deaf-mutism showed normal, or nearly normal vestibular reactions, and those rendered deaf-mute as the result of cerebro-spinal meningitis gave results denoting ablated vestibules, in the cases of congenital specific deaf-mutism on the other hand, some showed healthy reactions, while in others the vestibule did not function. One had hoped to be able to state definitely that if the vestibule was active in a deaf-mute, then the case was of the hereditary type. All that can be said, however, in view of the findings, is, that in the case of a deaf-mute with a functioning vestibule and with no stigmata of syphilis, the presumption is strongly in favour of the hereditary type of deaf-mutism.

No case was selected for the tests unless the primary cause of deafness was capable of full identification. To accomplish this, it was necessary to examine upwards of fifty deaf-mutes. The tests were carried out in the usual way, *i.e.*, by rotation ten times in each direction, and by syringing with cold and hot water, either until nystagmus appeared, or, until two minutes had elapsed without producing nystagmus. In class 1, the cases of hereditary deaf-mutism, there was in each case a well-established family history of deaf-mutism. The children were all born deaf, and there were no signs of syphilitic infection ; the middle ear was healthy in each case. In class 2, evidence was available that each child had suffered from epidemic cerebro-spinal meningitis, prior to the incidence of which disease the hearing had been normal. In class 3, the Wassermann test was positive in each case, and the children bore other syphilitic stigmata, interstitial keratitis, pegtop teeth, etc.

The following is the table of results :—

Vestibular Reactions in Deaf-Mutes

CLASS I.—HEREDITARY DEAF-MUTES.

Name.	Spon. Nyst.	Rot. R. Secs.	Rot. L. Secs.	S.R.C. Secs.	S.L.C. Secs.	S.R.H. Secs.	S.L.H. Secs.
A. H.	25	20	25	30	45	35
N. C.	30	25	35	40	35	50
A. M.	20	20	25	50	65	45
A. B.	30	25	30	25	25	35
D. T.	23	25	50	55	25	40

CLASS II.—CASES OF DEAF-MUTISM FOLLOWING EPIDEMIC CEREBRO-SPINAL MENINGITIS.

Name.	Spon. Nyst.	Rot. R.	Rot. L.	S.R.C.	S.L.C.	S.R.H.	S.L.H.
M. S.
W. C.
E. G.
K. B.
H. R.

CLASS III.—SYPHILITIC DEAF-MUTES.

Name.	Spon. Nyst.	Rot. R. Secs.	Rot. L. Secs.	S.R.C. Secs.	S.L.C. Secs.	S.R.H. Secs.	S.L.H. Secs.
J. M.	25	20	25	20	30	25
A. B.
C. T.
R. M.	30	25	30	30	25	30
J. H.	24	22	25	30	25	35
C. A.
C. M.
L. G.

The tests, rotation and syringing, in class 1, showed normal or nearly normal reactions on the part of the semi-circular canals. In class 2, neither syringing nor rotation evoked any reaction. The results in class 3 are mixed, but are in accordance with the pathological findings up to date.

I wish to thank Dr Kerr Love for so kindly placing at my disposal the clinical material in the Glasgow Deaf and Dumb Institute, and in the Tollcross Blind and Deaf School.

CLINICAL RECORD

A FATAL CASE OF SHAWL PIN IN THE ŒSOPHAGUS.*

By W. FRANK WILSON, M.B., Newcastle-on-Tyne, Hon. Assistant Surgeon, Throat and Ear Department, Royal Victoria Infirmary.

A YOUNG woman, aged 29, was recently admitted to the Royal Victoria Infirmary suffering from the effects of a foreign body in the gullet. The following history was obtained:—One week previous to admission, while she was dressing herself and talking to a companion, a glass-headed pin about 2 inches long, held between her lips, suddenly disappeared in her throat while she was laughing. She was removed to a neighbouring hospital where attempts were made to recover the pin by means of a coin-catcher. Unfortunately the coin-catcher became impacted and resisted every endeavour to withdraw it. No anæsthetic had been given up to this point, but on the arrival of an anæsthetist, general anæsthesia was administered and the coin-catcher was, after considerable difficulty, removed—the pin remaining behind. After recovering, the patient complained of severe pain in her throat and was unable to swallow, even liquids being returned after a longer or shorter interval. An X-ray plate was then made showing the pin in the gullet, about the level of the third dorsal vertebra, with the head down and the point directed upwards and well to the right side.

There being no other equipment in the hospital for dealing further with the case, the woman was transferred to the Royal Infirmary, Newcastle, five days after the accident. On admission she looked ill, hectic and feverish: temperature 100 to 101, and the pulse 80 to 90 during the first three days. She was still unable to swallow and complained of pain about the throat, which was tender on palpation. There was a copious, foul, purulent discharge from the gullet and, on account of the history and her symptoms of acute septic infection, it was considered inadvisable to attempt œsophagoscopy. On the fourth day the temperature fell to 99 and remained about normal for the next two days. Rectal feeding was carried out, but she lost weight rapidly. The temperature after this became markedly subnormal—starvation—and as she was still quite unable to swallow, gastrostomy was performed in the hope that the infection of the gullet might subside or, at any rate, improve.

* Read at the Meeting of the British Medical Association, Newcastle-on-Tyne, July 1921.

Case of Shawl Pin in the Œsophagus

The purulent discharge from the gullet continued, however, and the temperature rose again during the following days to 100 with slight remissions, with the pulse 90 to 100. Examination of the chest, which up to this time had been negative, now revealed extensive dulness over both bases, and acute general peritonitis supervening, death occurred eight days after gastrostomy, or nineteen days after admission to the Victoria Infirmary. Altogether, twenty-four days had elapsed since the pin was swallowed.

Post-mortem—Each pleural sac contained about one pint of thin grey offensive pus. On separating recent adhesions between the right apex and the posterior mediastinum, foul pus was found which had eroded the pleura and was beginning to involve the lung substance. The pus was coming from the mediastinum. The posterior wall of the pharynx was soft and friable, but showed no obvious inflammatory change. There was slight purulent infiltration in the retro-pharyngeal tissues. The cervical portion of the œsophagus was dilated and contained gastric contents and foul pus. At the thoracic inlet there was a small quantity of pus in the mediastinum, extending out beneath the pleura on each side to about the head of the ribs. The infiltration reached as far as the bifurcation of the trachea. Just above the tracheal bifurcation the mucosa of the œsophagus was congested and showed an area of granulation tissue. On the right side there was a shallow, oval depression about half an inch in diameter, and in the lower end of this was a small diverticulum which appeared to extend into the mediastinal tissues, and in this the pin was impacted.

There was an acute generalised peritonitis, but the exudate had no foul odour. The area of gastrostomy appeared to be intact. The other organs showed acute toxic change.

The case, like many others in the same category, furnishes proof of the great risk of employing blind measures for the recovery of foreign bodies of any description from the gullet. Mr Herbert Tilley in his *Manual on Diseases of the Nose and Throat* remarks that "coin-catchers, umbrella probangs and such like, should be relegated to the historical sections of anatomical museums: their employment has probably killed almost as many patients as it has saved." But we still find that no surgical instrument catalogue is considered complete without them; they repose awaiting their victim in every hospital both great and small; in every dispensary and in many consulting rooms the house surgeon fondles them, biding his time to show his hand. Who has been a house man and has not been

W. Frank Wilson

ensnared by their cunning device? And there lies the danger: for, to the inexperienced, these weapons convey the idea that they are practical tools.

It is almost unnecessary to add that these cases should always be screened and a good plate should be available before anything is attempted in the way of passing an instrument into the gullet. One has found by experience that personal inspection of the screening of the patient and the marking, at the same time, of the level of the foreign body by some external sign on the skin of the neck is helpful and comforting to the operator, especially in those cases in which, for some reason or other, the passage of the tube is difficult. I would like to mention here that smooth, round, foreign bodies, such as coins and that popular article of diet at children's parties, the round metal "blow-and-suck" whistle, may be simply extracted in the dark room with the screen by suitable blunt-ended, curved, œsophageal forceps, which open laterally or antero-posteriorly. Mr Whillis introduced the method, which has been used to my knowledge in the hospital for the last ten or twelve years. I must add that no one should attempt the method without first having seen it done by expert hands, and without being taught the proper manipulation of the instrument. The method applies only to foreign bodies which have lodged about the cricoid level.

In conclusion, I would point out that inability to swallow at all, or, ability to swallow with pain and difficulty the merest sip of water, indicates a grave injury to the walls of the œsophagus or gullet: the sign is independent of the size of the foreign body. The prognosis in these cases is extremely bad and œsophagoscopy fraught with great danger, if not absolutely contra-indicated.

I desire to express my indebtedness to Professor Stuart M'Donald and to Dr Shaw for the *post-mortem* notes on the case.

CRITICAL REVIEW

PERORAL ENDOSCOPY.

By PROFESSOR CHEVALIER JACKSON, Philadelphia.

Tracheal or Lower Bronchoscopy.—One phase of this subject seems to be disregarded. It should always be borne in mind that a tube too large to go through the larynx will not enter either main bronchus. It is obviously a physical impossibility to reach with a large tube a foreign body in a small branch bronchus deep in the lung. In such cases the tracheotomic route has no advantage whatever. Large foreign bodies in the trachea may be removed without any endoscopic tube if a very low tracheotomy is performed. It seems a platitude to say that foreign bodies in the main bronchi require a tube that will enter the main bronchi. Such a tube will readily pass through the normal larynx, and with it 100 per cent. of the foreign bodies lodged in the trachea and main bronchi can be removed by version, rotation, disimpaction, disentanglement, suction, or whatever solution of the mechanical problem is required for the particular case.

The difficult cases of bronchoscopy, as developed to-day, are those in which a small foreign body is in a small branch bronchus well out toward the periphery of the lung. Here a large tube is obviously useless because it cannot be got anywhere near the foreign body; and it is sad to see the quite unnecessary tracheotomy done in such cases because of the persistence of a fallacy in medical literature. Would it not be well to state that the tracheotomic route does not permit the use of a larger tube in the case of a foreign body located in a small branch bronchus.

Recently there has been offered for guidance in the choice between the oral and the tracheotomic routes the statement: "The upper never for vanity, the lower never for indolence." It is very unfortunate that so good an idea should be expressed in such ill-considered words. It is a sad commentary on the practitioner that he should be deemed in need of an aphorism to prevent him sacrificing the welfare or the life of his patient because of either vanity or indolence. Since it requires less effort and less time (about half a minute) to insert a bronchoscope than to do a tracheotomy, it is presumed that "indolence" refers to the practitioner who is too lazy to acquire the technique of peroral bronchoscopy. As to vanity, the sweeping accusation against the practitioner is very unjust to the now numerous bronchoscopists, who, by experience, have found it easier to work through the mouth than through the neck with the head

Chevalier Jackson

in the way. No one for a moment questions the advisability of tracheotomy for severe laryngeal dyspnoea. There are no contra-indications whatever to tracheotomy in such a case. If, after having done a tracheotomy for dyspnoea one practitioner prefers to work through the mouth, because for him it is easier to work in the usual way, and another practitioner prefers to work through the neck, because his instruments or his previous habit lead him to believe the tracheotomic route will increase his chances of success and lower his chances of mortality, each should be permitted to follow his conscience in doing what he believes best for his patient, without accusations of risking his patient's life or health from either indolence or vanity. Would it not be better to say: "Oral or tracheotomic route according to the equation of the case, the operator, and the available armamentarium"? The decision would then rest upon a scientific basis not on a question of the integrity of the operator.

New Bronchoscopic Instruments.—A number of efforts have been made by ingenious men to combine some form of grasping or hooking instrument with the bronchoscope. One who has cultivated bimanual manipulations with forceps and tube until they are co-ordinated like knife and fork in eating, would, at first, think of the awkwardness and limitations of the combined knife, fork, and spoon of the Northwoods trapper. But no one should condemn any effort on purely theoretical grounds; that has been the mistake in all spheres of human endeavour; even bronchoscopy itself was at first thus condemned. One thing, however, must be insisted upon, namely, that all new instruments be thoroughly tested, first upon the rubber tube, then upon the cadaver, next upon the living dog, and finally upon the adult patient—all these before attempting to use them upon a child.

Most foreign-body cases occur in children, and it makes one shudder to think of anyone experimenting upon a baby with an untested instrument, especially with a complicated combination of tube and grasping device. Bronchoscopy will not be advanced in the estimation of the profession by such short cuts in experimental development. What is most necessary for proper recognition of the merits of bronchoscopy and œsophagoscopy is the demonstration of the facility and harmlessness of their use (in trained hands), in order that the practitioner may feel justified in submitting his patient to them, rather than to the so frequently fatal external operations.

The Training of the Bronchoscopist.—Surgery like most other human activities will vary in skill with the individual ability of the operator. So it will be to the end of time, and it is needless to contest, or protest against, the inevitable. But when a practitioner who has never before looked through a bronchoscope or an œsophagoscope purchases one of these instruments and starts down the tender passages of a baby we

Peroral Endoscopy

have a lack of skill that would be unpardonable, almost criminal, if the lack were realised. The practitioner is not aware that he is almost certain not only to fail but to kill the child; whereas, with proper training, he could avoid all risk and almost certainly succeed in removal. This line of thought has been suggested by a letter received by the reviewer upbraiding him for not having urged that œsophagoscopy should be done only by those trained in the work. The letter was written by a physician whose child had died on the operating table during an attempt œsophagoscopically to remove a safety-pin by a surgeon who, though exceedingly skilful in all other branches, had no endoscopic training.

Anyone who has had endoscopic training and experience can see, all through the medical journals of to-day, reports of cases in which it is clear that the operator not only has had no training but he does not realise the necessity of any. A surgeon who has never done a cataract operation would not think of attempting the removal of a cataract without preliminary practice on dead animals' eyes. This is because the necessity for such practice has been established as an essential part of post-graduate medical education. In a cataract operation the operator has the unhampered use of both hands guided by binocular vision; and the worst that can follow his failure is the blinding of one of his patient's eyes. How much more necessary then is practice before attempting bronchoscopy and œsophagoscopy in a child with the limitations imposed by: (*a*) the smallness of the natural passages; (*b*) the knowledge that prolonged bronchoscopies in children are dangerous; (*c*) the necessity of gauging depth with one eye only while the image of the other is ignored; (*d*) the mechanical manipulations of unfamiliar instruments; (*e*) the problems of disimpaction, disentanglement, version, safety-pin closure or what not, that may be required for safe removal.

There is no intention to advocate here the creation of a new specialty. Any practitioner who wishes may do bronchoscopy; but it should not be attempted on a patient without preliminary education of the eye and the fingers in the peculiar requirements of the work. A theoretical or even a practical knowledge of the introduction of the endoscopic tube is not enough. All the special Societies have committees composed of their foremost men working upon the problems of post-graduate education of the specialist. The time is ripe for urging the necessity of preliminary training of those who may be called upon to do bronchoscopy and œsophagoscopy.

Foreign Bodies in the Larynx Simulating Diphtheria.—The tolerance of the larynx to the presence of foreign bodies for protracted periods is truly remarkable. Many instances are recorded of the presence of thin or flat non-obstructive objects for months before

Chevalier Jackson

serious swelling of the laryngeal tissues result in urgent dyspnœa. In a number of instances laryngeal diphtheria was diagnosed, and antitoxin was wisely given by the attendant practitioner, who had no one available capable of examining the larynx of a child. That practitioners frequently consider no other possibility, and ignore the history of choking on a "swallowed" object is shown by a number of case reports.

A typical instance of prolonged laryngeal sojourn of a foreign body in a child aged six years is cited by Orton,¹ who removed with the direct laryngoscope an open safety-pin which had been in the larynx for six months. Stridorous respiration finally demanded the services of a laryngologist after a diagnosis of diphtheria and antitoxin treatment, it being then considered that the tonsils were at fault. An important point in the history was the report of a radiographic examination on the day of the accident stating there was "nothing in the throat." The ease with which the larynx of a child can be directly examined without anæsthesia of any kind is not sufficiently appreciated by the general practitioner and pediatrician, and it is our duty to make known to them the necessity for the laryngeal examination of any child suffering from hoarseness or dyspnœa. On the laryngologist rests the obligation of being prepared, at all times, to go to the patient's home at the call of the family physician to make a diagnostic direct laryngoscopy, without anæsthesia, in a child too young to be examined with a mirror. Obviously general anæsthesia is doubly contra-indicated in the presence of dyspnœa and possible diphtheria; cocaine is not to be thought of in children.

Foreign Bodies in the Intestines.—The necessity of watching the progress of a foreign body through the intestines, until recovered from the stools, has been advocated. A confirmation of the wisdom of such watchfulness is illustrated in a case reported by Hagler and Stewart.² A man, aged 39 years, was admitted complaining of about two days' illness, the chief symptoms being generalised cramp-like abdominal pain, nausea without vomiting, and chilliness. Examination revealed tenderness in the right lower abdomen with right-sided rigidity, and general distension. The abdomen was immediately opened. The appendix was found adherent to a large omental mass which contained a loop of intestine, pus, and intestinal contents. Six inches of the damaged bowel, including Meckel's diverticulum, were removed. The diverticulum was found to be perforated by the sharp end of a fish-bone, the other end of which was blunt and was impacted in the opposite wall of the diverticulum. In spite of this prompt and skilful surgical intervention and after-care, the peritonitis extended and the patient succumbed.

We have in this case and similar cases in the literature, confirma-

Peroral Endoscopy

tion of the soundness of the opinion that while, as a rule, foreign bodies even though sharply pointed, usually pass safely through the intestinal tract, it is not safe to dismiss the patient from observation until the intruder has passed. Of course, in the case of the fish-bone no observation would have been possible, even if the patient knew he had swallowed it; but had the intruder been a needle or pin, its lodgment for a number of days in one location would have furnished the indication for abdominal operation by which the foreign body could have been removed before perforation.

Fish-hooks.—These are infrequently encountered foreign bodies and offer difficult problems of removal as anyone who has worked upon these problems in the laboratory will testify. A. Logan Turner³ reports the ingenious indirect removal from the laryngopharynx of a trout fly with fishing gut attached. "While the patient was moistening the gut in his mouth, the fly disappeared in his throat, but the end of the gut protruded from the mouth. He attempted by gentle traction to pull up the fly, but failed. The gut then disappeared. When examined with the mirror forty-eight hours later, the fly feather was detected just behind the left arytenoid and the free portion of the gut was seen passing downward behind the larynx. After cocainising by the drop method, the gut was grasped in laryngeal forceps and pulled upwards, a fresh hold being taken upon it at intervals until the free end could be seized and brought out of the mouth; this was anchored with artery forceps. The laryngeal forceps were again introduced, the fly grasped and pulled downwards so as to release the point. Extraction was then easy. The fly is a March Brown, and the gut is $8\frac{1}{2}$ inches in length." Even the most enthusiastic advocate of the direct method must agree that in this case the indirect method was the one of choice. The ingenious tethering of the foreign body by attaching a hemostat to the gut is certainly a precaution to be remembered. The increasing difficulties that would inevitably result from allowing the hook to follow its inherent tendency to work downward into the œsophagus, were at once prevented. The treatment of this case calls to mind the regrettable modern tendency to neglect cultivation of the art of indirect manipulation, which is, and always will be essential to the well-trained laryngologist. The only drawback to the mirror method of dealing with a foreign body at high levels is the risk of it dropping into the lower air passages, if it should slip from the grasp of the forceps or be dislodged before it can be grasped. This applies only to mirror laryngoscopy in the usual sitting position. It does not apply to Logan Turner's case because of the gut and the ingenious use made of it. The only other case of fish-hook recalled is that of D. R. Paterson,⁴ in which he very skilfully removed the hook by œsophagoscopy with the aid of an aspirating tube passed over the gut and used

Chevalier Jackson

as a protector of the tissues from trauma by the point of the hook. The reviewer is collecting data on the fish-hook problem and would be glad to receive published or unpublished reports of such cases.

Physical Signs of Foreign Bodies in the Air Passages.—It is a misfortune that there is a tendency to neglect careful physical examination in those cases in which the foreign body is of such density as to show clearly in the roentgenogram. In all such cases invaluable data could be obtained by the systematic record of physical signs made by an expert physical diagnostician unbiassed by any knowledge of the ray-findings.

In an interesting article Thomas M'Crae⁵ ably presents the subject of diagnosis from the view-point of the internist. The study of his cases suggested to him "a number of clinical problems: (1) How frequent is the occurrence of foreign bodies in the bronchi? (2) What symptoms and signs are there which are diagnostic or suggestive of their presence? (3) Is there any clinical picture or are there physical signs suggestive of the presence of a foreign body in the absence of röntgen-ray findings? (4) Are there definite physical signs suggestive of a particular kind of foreign body? (5) To what extent can we reduce the chance of error in failing to recognise the presence of a foreign body in a bronchus?" He states further: "It is evident that we have to discuss very different sets of conditions, and that no one description can cover all the cases. Thus, we have certain signs due to the foreign body and the local reaction set up by it, and others due to changes in the lung supplied by that bronchus. The character of the foreign body is important; a safety-pin may do little damage while a pea-nut causes marked changes very rapidly. One foreign body plugs a bronchus completely, another acts as a ball valve. Pus forms below the foreign body and may be retained or escape. The secretions may be forced into bronchi other than the one involved, or from the affected lung into the bronchi of the opposite one, so that signs are found on both sides. The signs may change greatly from hour to hour in acute cases, so that any set description fitting all cases is out of the question."

We read: "It is interesting to note how frequently the diagnosis of pneumonia is made in these cases. This comes out very frequently in the histories, but a careful study of the physical signs should prevent the error. Fever is very common after the aspiration of a foreign body, and if there is no dyspnœa, with cough and bloody or blood-streaked sputum, the diagnosis of pneumonia is suggested before the examination of the thorax is made. Decreased expansion on one side and dullness may suggest the diagnosis, but a careful study of vocal fremitus and the auscultatory signs should show that if the condition is pneumonia there is plugging of the bronchus—a rare condition.

Peroral Endoscopy

The writer has not seen pneumonia associated with any case of foreign body in a bronchus. The local signs are usually those due to the supplying bronchus being obstructed. Variations depend on the quantity of air in the portion of lung, the amount of secretion, and the persistence and completeness of the plugging of the bronchus. In many cases there are no breath sounds or râles heard over the affected parts, in others there may be râles but no breath sounds. In the majority, the affected portion of lung seems to be airless, and in the röntgen-ray plates at early stages it shows as a homogeneous shadow. Later, fibrosis, abscess formation, and bronchiectasis may be found. These show no special peculiarity in the physical signs, but are important in that they may be wrongly diagnosed as tuberculosis."

M'Crae's summary is as follows:—

"1. Cases of foreign body in a bronchus are not mere curiosities but are more common than we have supposed.

"2. There may be no disturbance at the time of entrance of a foreign body and no suggestion in the history of such a happening.

"3. Certain signs are of value, especially decreased expansion on the affected side, the presence of very fine râles, and the 'asthmatoïd wheeze.'

"4. Some foreign bodies, such as a pea-nut, set up a very acute general process which is fairly distinctive. Other structures, such as metallic objects, cause permanent changes, usually in a lower lobe.

"5. The chief errors in diagnosis are to mistake the signs for those of pneumonia in the early stages and in the acute cases, and for tuberculosis after the body has been present for some time."

REFERENCES.—¹ *Laryngoscope*, April 1921, vol. xxxi., p. 233. ² "Acute Perforation of Meckel's Diverticulum by Foreign Body (Fish-bone)," Hagler and Stewart, *Journ. Am. Med. Assn.*, 15th May 1920. ³ "Trout Fly, with Fishing Gut attached, removed from the Laryngeal Pharynx by the Indirect Method," Scottish Otological and Laryngological Society, 11th December 1920. ⁴ D. R. Paterson, "Removal of Foreign Bodies from the Air and Food Passages," *British Medical Journal*, 18th August 1906. ⁵ "Physical Signs of Foreign Bodies in the Bronchi," Thomas M'Crae, *American Journ. Med. Scs.*, March 1920, No. 3, vol. clix. p. 313.

SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY

May 20, 1921.

President—Sir CHARLES BALLANCE, K.C.M.G.

Discussion on Mr F. J. Cleminson's Paper: Sinusitis in Children (see p. 505).

THE PRESIDENT said that most of the symptoms which the author mentioned as associated with pus, or with secretion in the antrum of Highmore, were those which were commonly regarded as due to adenoids and enlarged tonsils; but there was at any rate one symptom mentioned by the author which was not present with adenoids and enlarged tonsils, namely, supra-orbital headache or neuralgia. John Hunter described supra-orbital neuralgia as a symptom of pus in the antrum of Highmore. That was the most striking feature which occurred to him in Mr Cleminson's paper; it indicated also pus in the other accessory sinuses of the nose. When pus existed in the antrum of Highmore, he, the President, thought puncture would not cure it. Puncture did not cure pus in any part of the body, except in very rare instances; and very seldom, he thought, chronic collections in the antrum.

Mr SYDNEY SCOTT said he had seen cases which gave support to Mr Cleminson's views, and he cited instances of a number of children whom he had seen for symptoms not directly referable to the accessory nasal sinuses, but in whom the routine nasal examination disclosed evidence of acute or chronic suppurative sinusitis.

Mr VLASTO drew attention to the fact that Mr Cleminson had made no mention of the approach to the antrum by the middle meatus. By this route he had washed out the antrum of a child who was suffering from severe nasal discharge over a long period after removal of adenoids and tonsils. One lavage effected a complete cure.

Mr E. WATSON-WILLIAMS said that at Dr P. Watson-Williams' clinic at Bristol they had for several years examined, as a routine, the sinuses of almost all children who were in-patients, using the suction syringe method. It was surprising how many had sinusitis.

Royal Society of Medicine

They did not employ local anæsthesia for children under fourteen. He agreed that puncture and lavage would often clear up an acute but not a chronic sinusitis in a child.

Mr LAWSON WHALE remarked that the author referred to influenza as a cause of sinusitis in children. Last year he had been occupied with a research on influenza and its results on the upper respiratory passages, and he had noticed that in young people the ethmoid cells were fully formed, but synostosis of the nasal bones had not yet occurred; there was widening of the bridge of the nose. Many cases of sinusitis in children were due to influenza, and the sign he had mentioned was worth looking for.

SECTION OF LARYNGOLOGY

May 6, 1921.

President—Dr W. JOBSON HORNE.

Bilateral Abductor Paralysis in Exophthalmic Goitre—Mr T. B. LAYTON, M.S.—Patient, a female, had been under treatment for exophthalmic goitre since 1895: the thyroid swelling had disappeared, but the exophthalmos was still present. No operation had been performed on the thyroid gland.

The case illustrated the possibility that, in some of the cases at any rate, in which paralysis of the vocal cord had been attributed to surgical interference upon the gland, the condition might have been present, undetected, before the operation.

Two Cases of Frontal and Ethmoidal Suppuration Complicating Scarlet Fever—Mr T. B. LAYTON, M.S., and Mr J. F. O'MALLEY, F.R.C.S.—The patients, aged 12 and 19 respectively, developed sub-periosteal abscesses and œdema of the eyelids secondary to suppuration in the ethmoidal cells. Both cases were treated by external operation and free drainage into the nasal cavity.

Mr O'Malley expressed the view that in those cases in which ethmoidal and frontal suppuration complicated scarlet fever, there existed an anatomical obstruction in the region of the middle turbinals prior to the infection. The particular virulence of the organisms associated with the scarlet fever produced an active inflammatory process causing denudation of the epithelium. Adhesions were produced, drainage was interfered with, and the pus being locked in found an outflow in another direction.

Societies' Proceedings

Excision of Pharyngeal Pouch: Development of Carcinoma at the Site of Operation—Dr W. H. KELSON.—Male, aged 78, had had a pharyngeal pouch removed seven years ago. A malignant growth developed at the situation of the pouch. [See *Proceedings*, 1921, xxv. (Sect. Laryngol. Roy. Soc. Med.), p. 44.]

Case of Pachydermia of the Vocal Cord—Dr E. D. D. DAVIS, F.R.C.S.—A Canadian, aged 46, complained of hoarseness and inability to sing. Both vocal cords were red and injected with patches of pachydermia upon the right. Wassermann negative: lungs and sputum negative to tubercle: treatment, including potassium iodide, had proved useless. Mr Davis regarded the case as one of chronic laryngitis due to improper and over-use of the voice.

Papillomata of Larynx—Mr G. W. DAWSON, F.R.C.S.I.—Female, aged 30, had suffered from hoarseness for six years. Irregular growths were present on both vocal cords and in the inter-arytenoid space.

June 3, 1921.

President—Dr W. JOBSON HORNE.

Collar Stud in the Œsophagus of an Infant, causing Spinal Osteomyelitis and Death—Dr DOUGLAS GUTHRIE.—(See *Journal of Laryngology*, 1921, p. 491.)

Three Cases of Laryngeal Tuberculosis treated with the Galvano-Cautery—Sir ST CLAIR THOMSON, M.D.:—

1. Miss A. C. had eighteen applications of the cautery between August 1912 and May 1917. Her larynx had remained healed for four years. The lesion was an ulcerated infiltration of the inter-arytenoid fold and both vocal processes.
2. Mr R. F. H. had had eight applications, commencing in May 1920. Bacilli are still present in the sputum.
3. Male, still under treatment for ulceration of right vocal cord. Since October 1920 he had had six applications.

Sir St Clair Thomson pointed out that local cauterisation was contra-indicated unless the general disease was either arrested or improving. It was applicable to only a few of the cases of laryngeal tubercle, because disease in that situation implied either a more acute infection than the average, or a specially low resistance.

Intrinsic Epithelioma of the Larynx—Sir ST CLAIR THOMSON.—Woman, aged 35, on whom laryngo-fissure had been performed in October 1920. The growth infiltrated the whole length of the left

Royal Society of Medicine

vocal cord, which moved freely. Of fifty cases of laryngo-fissure performed by the exhibitor, only six had been done on females.

Extensive Malignant Endothelioma of Nasal Cavity—

Dr DAN M'KENZIE.—The tumour, which had existed for six months, occupied the whole of the left ethmoidal labyrinth and the left antrum, and had extended into the orbit, onto the face near the inner canthus and had broken through into the mouth. The growth was removed and the raw surfaces were methodically treated by diathermy.

Sarcoma of Antrum and Ethmoid—

Dr ARTHUR HUTCHISON. Male, aged 59, with a long history of nasal obstruction, polypi, and suppuration. In October 1919, removal of polypi and radical operation on right antrum. In April 1920, swelling of right cheek and displacement of eyeball: Moure's operation performed: no malignancy detected. X-rays applied. December 1920, further operation and cartilage-like tissue removed from right orbit, and the sinuses on the same side. March 1921, enlargement of sub-maxillary glands; application of radium; improvement temporary; extension of disease again noted.

Case of Acromegaly—

Dr ELEANOR LOWRY.—Female, aged 39, with enlargement of face and hands and cystic enlargement of thyroid. Enlarged pituitary fossa with thickened floor and incomplete posterior wall.

Thyro-Glossal Cyst—

Dr W. H. JEWELL.—Male, aged 22, with a painless, fluctuating swelling on a level with the larynx immediately to the right of the mid-line of the neck.

ABSTRACTS

EAR.

"Does Removal of Adenoid Vegetations prevent Acute Disease of the Middle Ear?" JOHN ZAHORSKY. (*Laryngoscope*, Vol. xxxi., No. 1, January, p. 22.)

The author has studied the records of two hundred and twenty children who had adenoids, or both adenoids and tonsils removed. He found that thirty-two of the children had had one or more attacks of acute otitis media. Brief histories of twenty-nine of them are given. In the majority of the cases disease of the respiratory tract was present after removal of adenoids. The conclusion reached—"We cannot depend on adenoid removal as a prophylactic in acute infections of the middle ear"—does not seem quite justifiable.

ANDREW CAMPBELL.

The Oculo-Cardiac Reflex in Oto-rhino-laryngology. JEAN GIRON, Carcasson. (*L'Oto-rhino-laryngologie Internationale*, April 1921.)

1. *In Rhinology.*—The reflex, which is evoked by pressure on the eyeballs, has been found by the writer to be of service in bouts of sneezing, such as are met with during the process of using the cautery in the nose whether the galvano-cautery or chromic acid. Pressure on the eyeballs stopped the attacks at once.

2. *In Laryngology.*—Hiccough is said to be a myoclonic condition of the diaphragm and the larynx acting synchronously. Pressure on the eyeballs, acting through the vagus, is said by the writer to stop hiccough of the most stubborn kind, *e.g.*, the hiccough which occasionally accompanies the recurrent paralysis of aortic aneurysm, and also that of the epidemic variety.

3. *In Otology.*—(a) In the tinnitus caused by blood sounds, whether the physiological type from the carotid, or that of atheroma or anæmia, momentary relief can be obtained by pressing the eyeballs. The action seems to cause bradycardia, and brings about the desired result by affecting the rhythm of the circulation.

(b) In labyrinthine vertigo certain cases of soldiers with injured labyrinths showed exaggerated oculo-cardiac reflexes, but there was not found to be any relationship between the conditions. The reflex is abolished in syphilitic labyrinths.

(c) In intracranial complications of otitic origin, the oculo-cardiac reflex is found to be inverted. The example given is that of a patient with brain abscess, whose pulse was 48. On evoking the oculo-cardiac

Ear

reflex, the pulse bounded up to 108. With the evacuation of the abscess, the pulse slowed, the inversion of the reflex diminished, and after the operation the reflex became normal.

GAVIN YOUNG.

The Organisation of Inflammatory Exudates in the Middle Ear.

W. DOEDERLEIN. (*Zeitschr. f. Ohrenheilk.*, Bd. 79, H. 1, 1920.)

In this paper the author has made an exhaustive study of the early stages of organisation in the middle ear. The material studied consisted of sections of thirty-nine temporal bones from cases of otitis media varying in duration and severity.

Into the exudate lying in the middle ear spaces there grow out connective tissue cells which later become hollow and vascularised. Numerous other cells go out along with these and form granulation tissue. The exudate in this way becomes gradually replaced by cellular and fibrous elements. The epithelium of the mucous membrane at the same time begins to spread along these bridges on to the exudate mass till we have a narrow cleft, lined on both surfaces by epithelium, between the original mucosa and the exudate. As the organisation proceeds and more bridges are formed the cleft becomes divided up into small open spaces (pseudocystic spaces). In the case of the mastoid cells these are generally in the form of a ring, looking on section something like a string of pearls. In the case of the tympanic cavity this appearance is not seen so frequently on account of the irregular contour of the cavity. The exudate mass after vascularisation and organisation gradually shrinks, partly from absorption and partly from contraction of the fibrous tissue, and results eventually in the formation of scars or adhesions. This process of organisation takes place only in the narrow parts of the middle ear cleft such as the mastoid cells, between the limbs of the stapes, between the stapes and its niche, and in the round window. The author has never seen it round the orifice of the tube. The explanation given why organisation does not take place in the tube region is that during an otitis media the fluid in the middle ear is kept continually oscillating through the pulsation of the hyperæmic mucosa. Near the tube, moreover, there is the additional suction which occurs during swallowing, and by which the cavity tends to get rid of secretion. In the other parts of the cavity, however, the exudate tends to stagnate and become organised. Organisation apparently occurs only in exudates containing cellular elements.

Round the orifice of the tube a somewhat different process takes place. The mucosa becomes very swollen and corrugated, and the hollows thus formed sometimes become shut off and form cysts. These are lined by cylindrical ciliated epithelium in contra-distinction

Abstracts

to the pseudocystic spaces which are lined by squamous or cubical epithelium.

Organisation may commence very early as is shown by a case of otitis media of only seven days' duration. In this case the mass of exudate in some of the mastoid cells had been already replaced by granulation tissue and even a certain amount of fibrous tissue.

The types of middle ear disease tending most towards organisation are the subacute and chronic. Cases with an insidious onset and thick secretion are particularly liable to cause permanent thickening of the tissues. Acute suppurative cases are not generally followed by a great amount of organisation of the exudate, as there is usually so much reaction that perforation occurs early with free evacuation of the contents of the middle ear cavity.

J. K. MILNE DICKIE.

PHARYNX.

The Value of Vaccine Therapy versus Tonsillectomy in Systemic Disease of Tonsillar Origin. H. HAYS, ARTHUR PALMER, and T. S. WINSLOW. (*Medical Record*, 19th February 1921.)

The writers state that it is well established that tonsillar disease may be directly responsible for acute articular rheumatism, endocarditis, kidney disease, and iritis. Other authors mention pleurisy, acute osteo-myelitis, tuberculosis, general sepsis, actino-mycosis, chorea, Hodgkin's disease, pericarditis, myocarditis, neuritis, adenitis, keratitis, herpes, phlebitis, scarlet fever and possibly typhoid fever, leukæmia, and appendicitis. To these may be added a chain of symptoms grouped under the terms mental and physical depression.

There is no way of telling whether a tonsil is responsible for systemic infection without taking a culture to find out whether pathogenic bacteria are present in sufficient numbers. The supra-tonsillar fossa is the site from which to take the culture. The streptococci, mainly hæmolyticus and viridans, are the only organisms in the throat which are responsible for systemic infection.

The writers emphasise the following points:—

1. Systemic disease is often of tonsillar origin when the tonsils are small and show little evidence of disease; closed crypts are more dangerous than open and discharging ones.
2. When a culture taken from the supra-tonsillar fossa shows any form of streptococcus, the tonsils should be removed if any systemic disease is present.
3. Tonsillectomy is a much better procedure than the administration

Pharynx

of vaccines unless operation is contra-indicated, as in case of elderly patients, severe kidney disease, or severe valvular lesions.

4. A small piece of tonsillar tissue left behind after operation may keep up the systemic infection.

5. The value of the vaccine as a curative agent is yet to be proved.

LINDLEY SEWELL.

Enucleation of the Upper Pole of the Tonsil. CAZEJUST.

(*Revue de Laryngologie*, February 1921.)

In any operation on the tonsil it is essential that the upper pole be completely removed. Enucleation of the whole tonsil as a routine procedure may be a mistake, as we cannot be certain that we are not thereby suppressing some useful function or protective agency. The writer proposes the rational course of removal of the upper, with the retention of the lower pole. There are two points to be settled: how much to remove, and how best to do it.

With regard to the first point, how much to remove, the writer of the paper is not very precise, except that it should include the whole of the buried intrapalatal portion. The procedure he recommends is that of Mouret. Under local anæsthesia, the tonsil is freed by dissection in front and behind. A sharp hook or hook-shaped knife is introduced between the tonsil and the plica semi-luminaris in an upward direction until the point penetrates the velum at the junction of the anterior and posterior pillars, and the intervening tissues are cut through. The palato-glossus and palato-pharyngeus muscles are separated by blunt dissection, thus disengaging the upper pole, which falls forward, when traction is made on it (picturesquely described as "une révérence amygdalienne") and can be removed by scissors or snare.

G. WILKINSON.

Local Anæsthesia for the Enucleation of Tonsils. T. B. LAYTON.

(*Guy's Hospital Reports*, April 1921.)

If it is the case, as stated at the commencement of the paper, that local anæsthetics are seldom used in this country in operations on the tonsils, and hardly at all in London, this well-written description of the method is a timely contribution. The technique consists in swabbing the pharynx and base of the tongue with cocaine and adrenalin, injection of a weak solution of novocain and adrenalin into the anterior and posterior pillars, pulling the tonsil inwards and forwards by means of Vulsellum forceps, and snipping round the surface of the pillars with curved scissors. The final removal of the tonsil when all but the lower part has been separated, is then effected by a strong snare, although some of us, like Layton, prefer

Abstracts

now to complete the operation with the scissors, as being more speedy and less painful. Again, a gargle of hydrogen peroxide is kept at hand to clear the field of blood from time to time if necessary, and the surgeon sits higher than the patient, instead of lower, for greater comfort in his manipulations.

This is the operation *par excellence* where there is a history of quinsy, and where consequently adhesions between the tonsil and the surrounding tissues are likely to interfere with the movement of inversion necessary for enucleation by the blunt guillotine. Probably most of those who use the method retain it for this class of case almost entirely, and for that reason will not be prepared to agree with Layton's statement that there is less bleeding than with guillotine enucleation. In these cases bleeding is apt to be troublesome, probably from new-formed vessels in the adhesions, and of course we miss the clamping action of the blunt guillotine on the normal vessels.

T. RITCHIE RODGER.

Vincent's Angina Infection. FRANK RICKORD, M.D., and M. C. BAKER, M.D. (*Journ. Amer. Med. Assoc.*, Vol. lxxv., No. 24, 11th December 1920.)

This paper deals with a series of 56 cases. Statistics do not show the prevalence of this disease as it is not notifiable. Oral sepsis plays a very prominent part. Smears taken from pipes and cigarette holders have frequently been positive, while drinking vessels were also a source of infection in the Canadian Expeditionary Force.

Emphasis is laid on the value of arsphenamin locally in the form of a 10 per cent. solution in glycerine, *i.e.*, 0.6 gram of the drug dissolved in 2 fluid drams of glycerine.

(1) It seems to be definitely proved that the fusiform bacillus and the accompanying spirochæte are one and the same, the latter being an evolutionary form of the former, but always present with the bacillus.

(2) The writers believe that Vincent's angina is much more common than is at present realised, and that it is not recognised because of the failure to take a smear. Frequently it is mistaken for diphtheria and syphilitic ulcers.

(3) It is probable that the use of sweets or proteins with the subsequent lack of oral cleanliness predisposes to this infection; likewise carious teeth harbour the organism, and that it will manifest itself in its characteristic lesions whenever a suitable opportunity is given. It appears to be more frequent during the winter months.

PERRY GOLDSMITH.

Pharynx

The Mechanism of the Carrier State, with Special Reference to Friedländer's Bacillus. A. L. BLOOMFIELD. (*Johns Hopkins Hospital Bulletin*, January 1921.)

Bloomfield has made a careful investigation of the "carrier" problem, and concludes that there is always a focus of diseased tissue which affords a breeding ground for the organisms. They do not grow on the free mucous surfaces but lurk in the crypts of the tonsils, and when they emerge on to a free surface they disappear at the same rate of speed as in a non-carrier. Friedländer's bacillus was found in 5 per cent. of eighty-five unselected persons, and it was found impossible to produce in others a carrier state by transplantation of the bacilli.

DOUGLAS GUTHRIE.

The Significance of the Bacteria found in the Throats of Healthy People. A. L. BLOOMFIELD. (*Johns Hopkins Hospital Bulletin*, February 1921.)

When organisms are found in pure culture, as in meningitis and various septic conditions, their causal relationship to the disease is readily proved. But when the ground is already occupied by organisms not causing the disease, or by a host of secondary invaders, it is naturally more difficult to trace the culprit. Much confusion has arisen owing to lack of consideration of the flora as a whole, both in health and in disease.

The author made a study of six healthy individuals and found that the organisms present in the throat fell into two groups:—(1) The true normal flora, comprising non-hæmolytic streptococci and Gram-negative cocci. (2) The pathogenic or non-pathogenic organisms which are accidentally introduced and rapidly eliminated in health.

DOUGLAS GUTHRIE.

Variations in the Bacterial Flora of the Upper Air Passages during the Course of Common Colds. BLOOMFIELD. (*Johns Hopkins Hospital Bulletin*, April 1921.)

Despite its frequency and prevalence, the exact nature and cause of the common cold are still unknown. The malady presents a close analogy to influenza, which, though mild in itself, creates a predisposition to severe complications such as sinus infections, middle ear suppuration, and bronchitis. A study of the literature shows that the primary disease and its complications are frequently confused, but when the uncomplicated cold has been studied it became apparent that no known organism could be regarded as its cause. The majority of observers appear to have been unfamiliar with the normal variations in the bacterial flora of the mouth and nose, and the most

Abstracts

convincing researches are those of Kruse and Foster, who proved that the infecting agent in "colds" was a filtrable virus. The author, in a careful bacteriological study of ten cases of acute coryza, found that the flora closely resembled that which is found in normal individuals—non-hæmolytic streptococci and Gram-negative cocci being constantly present, as in health. When complications occurred, however, there were present pathogenic organisms such as did not exist in the normal flora.

DOUGLAS GUTHRIE.

Diagnosis and Treatment of Diphtheria. F. H. THOMSON.
(*Lancet*, 1921, Vol. ii., p. 68.)

The writer draws attention to the fact that diphtheria may occur as (1) a varying degree of inflammation without pultaceous or membranous deposit; (2) an inflammation and œdema with definite membranous or pultaceous deposit; (3) an ulcer or ulcers caused by a mixed infection, with or without deposit; or as (4) a most pronounced inflammation and œdema, with or without deposit. In cases which are very acute and doubtful as to certain diagnosis, the delay of treatment for bacteriological examination is to be severely condemned. Treatment is summed up in three heads—suitable nourishment, adequate dosage of antitoxin, and complete rest in the recumbent position. The earlier one can treat the disease the better, and if one fails to get the patient early, the dosage should be greater. To arrive at the approximate dose one must be guided by the stage of the disease, the rapidity and progress from the onset of the symptoms, the amount of inflammation and œdema, the amount of cellular infiltration, the involvement or not of the nose or larynx, the fœtor and the presence of hæmorrhage into the skin. Finally, in all severe cases to add 4000 units to cover possible error. Intra-muscular administration is preferable (*vastus externus*). Thomson gives a useful table as a guide to dosage. As regards recumbency, it should be complete and should last for at least fifteen days, and its relinquishment should be gradual.

MACLEOD YEARSLEY.

The Schick Reaction and Diphtheria Prophylactic Immunisation with Toxin-Antitoxin Mixture. A. P. GLENNY and R. A. O'BRIEN.
(*Lancet*, 1921, Vol. i., p. 1236.)

The writers consider this method of diphtheria prophylaxis the greatest advance since the introduction of antitoxin. The test consists in the intradermic injection of 0.2 c.cm. of a dilution of diphtheria toxin containing in 0.2 c.cm. 1/50 m.l.d. for a guinea-pig. Reaction may be "negative" (given by people with antitoxin in their blood); "positive" (shown by a persistent red flush at the spot where the

Miscellaneous

unheated toxin was injected); "pseudo" (a reaction given by people with antitoxin in the blood); and "combined" (reaction shown by those who are sensitive to toxin and also to the "pseudo" constituent). Unfortunately the authors cannot bring forward a long series of results. The method, has, however, been carried out in America in tens of thousands, with good results.

MACLEOD YEARSLEY.

MISCELLANEOUS.

The Intracardiac Injection of Adrenalin as a Means of overcoming Cardiac Failure occurring during the Administration of Anæsthetics.

HERMANN FRENZEL. (*Münchener Med. Wochenschrift*, 68 Jahr., No. 24.)

This is the record of a successful case in which cardiac failure occurred in a female patient aged 41 on whom a radical mastoid operation was being performed under A.C.E.

The technique used is described as follows. The injection was made with a Record syringe to which was attached a well-fitting needle 10 cm. in length. The needle was inserted in the fourth intercostal space close to the sternal margin. During insertion it was inclined about 10° medially. The action should be slow and deliberate, and be accompanied by a slight withdrawal of the piston until at a distance of about 3½ to 4½ cm. there is a perceptible diminution of resistance and some blood is aspirated. The injection of 1 c.cm. of a 1 : 1000 solution of adrenalin solution was then made.

A summary is given of eight other cases in which this method was tried by others and in five of which it was permanently successful.

No injuries were observed to follow the use of the drug in the manner described. Given a correct technique the dangers of the procedure are held to be negligible.

The chances of success are *inter alia* dependent upon the interval that has elapsed before the injection is undertaken. Ten minutes is the maximum period, and success can only be expected if the interval has been a relatively short one.

The procedure merits a permanent place in the armament at our disposal for fighting the form of cardiac failure under consideration, and it would be advisable to have the means of carrying it out immediately at hand whenever a general anæsthetic is administered.

Should artificial respiration and heart massage be unsuccessful within three minutes, the injection should be undertaken whilst these means of restoration are continued. In the absence of more extended experience the indications for laparotomy and direct sub-diaphragmatic heart massage should remain unaltered, that is to say it should be

Abstracts

carried out, in the absence of other possibilities, if in a further period of three minutes success has not been attained.

JAMES B. HORGAN.

On the Function of the Vermis Cerebelli in Rabbits. T. HOSKINO.
(*Acta Oto-laryngologica*, Supplement 2.)

This paper deals mainly with the eye movements produced by stimulation of the vermis and their relation to the eye reflexes of vestibular origin. The experiments were conducted on rabbits because they are almost free from eye movements arising from optical reflexes. The animals were fixed on a Bárány's turn-table, the posterior fossa exposed under local anæsthesia, and in order to render more easy observations on the nature and degree of the eye movements, one vertical and two horizontal lines were drawn with a cautery point across the cornea of each eye. For electrical stimulation a double electrode with platinum points 2 mm. apart was used, and it was found better to apply this to the surface of the dura over the desired brain area than directly to the cortex, since by this means all risk of injury to the delicate brain tissue was avoided.

The following phenomena were observed:—

(1) By stimulation of a definite part of the vermis with a weak Faradic current, or by mechanical means, there was produced a single rapid horizontal movement of the eyes towards the stimulated side. When the stimulation ceased the eyes returned with a jerk to their former position.

(2) The area from which these movements can be produced is the median portion of the lobulus simplex (Bolk), and the neighbouring region above and below it (the ophthalmotropogenous zone). The lateral portion of this area gave the best reaction. It was produced by stimulation of no other part of the vermis.

(3) The eye movements, in which were concerned the external and internal recti muscles alone, were affected neither by the position of the head or the body of the animal, nor by bilateral destruction of the labyrinth.

(4) Application of cold to the ophthalmotropogenous zone of one side produced only a slight horizontal deviation of the eyes towards the opposite side.

(5) Electrical stimulation of this area during rotation and caloric nystagmus caused in nystagmus to the stimulated side an increase of amplitude and diminution in rapidity, as well as a prolongation of the slow movement, while nystagmus to the opposite side was diminished in amplitude and increased in rapidity with hastening of the slow movement.

Miscellaneous

(6) Application of cold and bilateral destruction of the area result in a diminution of amplitude and increase in rapidity of the nystagmus with a hastening of its slow movement.

(7) Lateral movements of the thorax during vestibular nystagmus affect it just as do electrical stimulation, cold, and destruction, the diminution of amplitude with increase of rapidity, etc., being, however, produced on movement of the thorax towards the same side as the nystagmus, and the opposite effect following movement towards the other side.

(8) The eye movements resulting from movements of the thorax are not affected by total removal of the vermis and of both labyrinths.

(9) The rapidity of vestibular nystagmus is diminished by exposure of the vermis or of the dura over it (? bilateral stimulation).

(10) The difference between the nystagmus to right and left with unilateral cold application or destruction of vermis cortex were variable, but on the whole the nystagmus to the side dealt with was decreased in amplitude and increased in rapidity with hastening of its slow movement, while nystagmus to the other side showed the opposite changes.

(11) When during extirpation of the vermis the roof of the fourth ventricle on one side is removed, there follows a strong deviation of the eye of the same side upwards and backwards, and of the other eye downwards and forwards, while both eyes rotate backwards. The deviation disappears soon after completion of the operation, the rotation lasting a little longer.

(12) After extirpation of the vermis and the whole of the roof of the fourth ventricle, the vestibular nystagmus is greatly accelerated and reduced in amplitude.

(13) The changes in the nystagmus (especially the increase in its rapidity) after extirpation of the vermis or destruction of its cortex affect the horizontal nystagmus alone, while the rotatory and the vertical nystagmus undergo no characteristic change, and indeed often remain unaltered both in quantity and quality.

The author considers that his observations do not yet justify a definite answer to the question of the function of the vermis in relation to eye movements. It is indeed very probable that the vermis is necessary for the normal production of vestibular nystagmus, and particularly of the quick movement of horizontal nystagmus; but how its function is exercised is still doubtful, and will remain so until further experiments may have thrown more light on the function of neighbouring centres.

THOMAS GUTHRIE.

REVIEWS OF BOOKS

The Medical Annual: A Year-Book of Treatment and Practitioner's Index for 1921 (thirty-ninth year). Pp. 616. Bristol: John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd.

The Medical Annual fulfils again to the full its purpose of placing before all practitioners, whether general or special, a useful and accurate synopsis of the latest points in the healing art and science. We have ventured to suggest that an examination of the contents of the current volume of this work would afford a very reliable means of gauging the practitioner's knowledge of his profession. Even if this be only a fancy, the practitioner can satisfy himself that his knowledge is quite up to date if he has thoroughly studied the volume of the year.

From the point of view of our special readers the abstracts of the past year's output of literature on our subjects can scarcely fail to present something new to every one of them, but, as we hope they are not specialists without interest in general medical and surgical progress, the chapters on subjects which do not directly form part of our specialty will prove of particular educational value. Tuberculosis, for instance, is to us of special as well as general interest. Dr Arthur Latham has been most generous in the amount of material and laborious abstracting on the medical, and Sir W. J. de Courcy Wheeler on the surgical side. In therapeutics, Professor Frank Charteris gives us much fresh and interesting information. The effects of various antipyretics upon hearing must be quite unexpected to many of us (p. 3). Among other points, while acetanilide alone reduces hearing, combined with sodium bicarbonate it increases it, and while salol and acetanilide separately diminish hearing, their combination together results in improved hearing.

Mercurochrome—220, which is dibromoxymercury fluorescein or its sodium salt is said in a 1:1000 solution to kill the staphylococcus aureus (in urine at least) in one minute, and to be practically fifty times as actively germicidal as acriflavine in urine (p. 15). This has not escaped the notice of otologists, and Callison recommends its use in chronic suppurative otitis media (p. 352). Adrenalin is advocated in labyrinthine vertigo (p. 511), and we may remember Richard Lake's advocacy of ernutin. Adrenalin is also advised by Caldera (p. 352) in otosclerosis as diminishing the tinnitus and even improving the hearing. Dr John S. Fraser of Edinburgh

Reviews of Books

gives, as ever, a full and conscientious series of abstracts of the latest communications in the realm of otology. To admit that one has overlooked many of the original papers which he has abstracted may be a confession of weakness, but it is only an exceptional reader who can keep pace with Dr Fraser in otological literature. No aspect of the subject has escaped him and his handling of it in the *Annual* is, if possible, better than ever. Mr Wright has taken over Dr Watson-Williams' responsibility for laryngology and rhinology, and has striven well to keep up to the standard set by his predecessor.

This issue is not merely "excellent in parts," it is good through and through.

J. DUNDAS-GRANT.

*Block Anæsthesia and Allied Subjects, with Special Chapters on the Maxillary Sinus—Tonsils—and Neuralgias of the Nervus Trigem-
inus.* By ARTHUR E. SMITH, D.D.S., M.D., Oral Surgeon to
Frances Willard Hospital and to House of Good Shepherd,
Chicago. 595 Illustrations. 1921. London: Henry Kimpton.

In a foreword to this book, C. N. Johnson, Chicago, writes: "He who reads the book will be more deeply impressed, than he ever was before, with the breadth and scope of local anæsthesia." Certainly Dr Smith goes into the whole subject very thoroughly and clearly.

The first 300 pages of the book are devoted to history and methods of anæsthesia—general and local—a very full account of the anatomy of the nerves of the head and neck, with exceptionally clear illustrations and photographs of "wet" specimens—the description of the fifth nerve occupying 100 pages—a discussion on the armamentarium required and the solutions advisable for use in block anæsthesia. The author recommends the use of procaine suprarenin Ringer solution; for convenience he has this made up in tablet form containing gr. 1/1600 suprarenin, gr. $\frac{1}{8}$ procaine, which in 1 c.c. water gives 2 per cent. solution of procaine in a Ringer isotonic vehicle.

There is perhaps too much repetition in these pages, and too much space taken up with the chemical, commercial, and even national side of the subject.

Dr Smith emphasises repeatedly that successful nerve blocking by the perineural method can only be acquired by careful, persistent study of the anatomy of the parts involved, solutions used, and appliances necessary.

In a section on tonsillectomy, by which the author means dissection of tonsils, as opposed to tonsillotomy, which term he applies to the guillotine operation under a general anæsthetic, he suggests blocking the pharyngeal and tonsillar plexus through the anterior tonsillar pillar, and blocking Meckel's ganglion by the external route through the

Reviews of Books

mucous membrane distal to the third molar, making no mention of the nasal route adopted by Sluder.

In this method of anæsthetising the tonsil he hopes to obtain a field free from spread of infection such as one might get in the infiltration method, and also very little bleeding during the operation, due to the action of the procaine and adrenalin a little distance from the actual area operated upon.

One chapter deals fully with the surgery of the antrum, the operations intra- and extra-nasal being very well illustrated.

Block anæsthesia for mastoid and intracranial operations is fully described. The various forms of trigeminal neuralgia are discussed with details of alcohol block injections.

The book is written for laryngologists, dentists, and students. But it is a collective work, putting local anæsthesia in an altogether new light, and it is extremely valuable as a book of reference for the anatomist, surgeon, and teacher.

G. EWART MARTIN.

LETTER TO THE EDITORS

TO THE EDITORS,

The Journal of Laryngology.

SIRS,—I should like to raise the question of the production of a British Atlas of Laryngology, and to indicate sources from which part of its contents might be drawn.

No apology for this suggestion is necessary, as a purely British Atlas of our specialty has never—to my knowledge—been published; hitherto we have been dependent upon foreign works or English translations of these.

I am led to make this appeal not only because an atlas is a desideratum, but also on account of the material available for inclusion in a work of this kind.

I refer in particular to drawings, or the blocks themselves, that have served to illustrate papers dealing with our specialty published in this and other journals, also in monographs and in text-books no longer in circulation.

Rare and interesting conditions have been depicted not infrequently in the smaller or local medical journals; and some of the out of date text-books contain illustrations which are still unsurpassed.

In the case of drawings and blocks considered suitable, arrangements for their reappearance in an atlas could probably be made with the owners.

In addition to these older sources there are others. Many of us have laid aside sketches of unusual appearances which singly may scarcely warrant publication, but with several of an allied nature would help to form a valuable series. You, Sirs, at the last meeting of the Scottish Otological and Laryngological Society exhibited a large collection of drawings and water-colour sketches, many of which ought to be published.

This raises the question of cost. At present, the price of blocks and all expenses incidental to the issue of a new work are abnormally high. I am not advocating, however, the immediate production of an atlas but its preparation. In the years that must elapse before the material at disposal could be selected and arranged, new sketches made and descriptions written, costs are likely to have fallen.

A work of the kind outlined would probably be best issued at intervals in fasciculi, each containing one or more plates devoted to nose, pharynx, larynx, etc., respectively. The titles, or even the

General Notes

entire letterpress, might be printed in several languages. When complete the plates could be arranged and bound.

The scheme suggested should make no undue demands on our time or purse. A more ambitious one involving, for instance, the production of an encyclopædic work on our specialty, although highly desirable, is scarcely practicable at present.

This project is submitted to the readers of the *Journal of Laryngology* in the hope that it will meet with their approval, and that the Directors of the *Journal of Laryngology and Otology, Ltd.*, in association if possible with the Laryngological Section of the Royal Society of Medicine will, after due consideration, see fit to supervise, and if necessary subsidise the proposed undertaking.

British laryngologists are a united brotherhood. There are no rival factions to view one another with suspicion and jealousy. The time, therefore, is opportune for a joint national effort.—Yours faithfully,

A. BROWN KELLY.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, W. 1.

Section of Laryngology—*President*, Sir William Milligan, M.D. *Hon. Secretaries*, Walter G. Howarth, F.R.C.S., and T. B. Layton, D.S.O., M.S. The first Meeting of the Section will be held on Friday, 4th November, at 4.45 o'clock.

Section of Otology—*President*, Dr A. Logan Turner. *Hon. Secretaries*, Norman Patterson, F.R.C.S., and F. J. Cleminson, M.Ch. The next Meeting of the Section will be held on Friday, 18th November, at 5 o'clock. Members proposing to show patients or specimens, etc., should send notice along with a short written description to the Senior Hon. Secretary, Norman Patterson, F.R.C.S., 16 Devonshire Place, London, W. 1, at least twelve days before the Meeting. Papers, complete and ready for printing, must be sent at least twenty-one days in advance.

* * *

TENTH INTERNATIONAL CONGRESS OF OTOTOLOGY.

As already announced the Congress will be held in Paris next year. The date was originally fixed for the 26th to the 30th July, but we are very pleased to hear that our French colleagues are

General Notes

endeavouring to settle on another date which would not interfere with the Meeting of the British Medical Association in Glasgow and which, at the same time, would be convenient to other foreign countries.

Although the Congress only bears the title of Otology, we are informed that it will practically be a Congress of Oto-Laryngology. We are also particularly glad to hear that the practical side of the Congress will be increased by visits to hospitals, operations, and exhibitions of patients. The services of surgeons who specialise on the surgery of the head will give demonstrations, and there will be visits to the Institut Curie.

The President of the Congress is Professor Sébilleau and the Secretary General, Dr A. Hautant, 28 rue Marbeuf.

All who have joined the Committee of Organisation for Great Britain and Ireland can obtain further particulars from the Hon. Secretaries, Lionel Colledge, F.R.C.S. (22 Queen Anne Street, London, W. 1), or Dr J. S. Fraser (50 Melville Street, Edinburgh).

* * *

ÓNODI COLLECTION.

The following paragraphs, which will interest our readers, are extracted from Sir Arthur Keith's Annual Report upon the Museum of the Royal College of Surgeons of England :—

“The most important gift to the Museum during the year is the series of specimens illustrating the anatomy of the nose and of its accessory sinuses, and known as the Ónodi Collection. The history of this valuable addition is as follows. Professor Adolf Ónodi of Budapest, known in his earlier years by his researches in Embryology, attained a world-wide reputation by his writings on the anatomy of the nose, particularly of the variations and relationships of the accessory nasal air-sinuses. He formed the most complete collection of preparations ever made to illustrate the anatomy of the nose—the preparations on which his atlas and other writings are based. His *Atlas on the Anatomy of the Nasal Cavity* was translated into English by Sir St Clair Thomson in 1895 ; all the specimens used to illustrate this atlas were and are in his collection. Professor Ónodi died 18th November 1919, and in the following summer his son, Dr Ladislaus Ónodi, brought the collection to England with a view to selling it. As there was a danger of the collection going abroad again, Sir St Clair Thomson and Mr Philip Franklin very patriotically came forward, and at their own risk bought the collection for £250, with the view of its being purchased and presented to the Museum of the Royal College of Surgeons—a scheme which appealed to Dr Ladislaus Ónodi. A committee was formed and the purchase money was raised by subscription—largely owing to the personal efforts of Mr Philip Franklin, a Fellow of the College. The collection was offered to the College by the Committee, and was accepted by the Council at its meeting, 6th January 1921. Subsequently the Committee was in a position to give a sum of £32, 5s. 8d., which it suggested

General Notes

should be used to help in defraying the expense of printing a descriptive catalogue of the collection.

"In accepting this valuable gift the Council of the College was well aware of the financial responsibility it had undertaken. The Conservator had reported that it would cost at least £650 to mount and display the specimens, to make no mention of the annual outlay in upkeep. In the condition in which they were received the specimens were unfit for exhibition, being still in a rough undissected state, but with all the possibilities of being made into finished preparations. On being presented to the College, the Prosector, Mr Henry Wilson, settled down to give the specimens a finished form—a laborious undertaking which will occupy the greater part of two years ; but that the result will be commensurate with the labour involved may be seen by anyone who will visit the exhibition to be given in October next. Altogether there are 400 specimens in the collection, half of which are dried macerated preparations, the other and more valuable half 'wet' specimens, preserved in alcohol. With the consent of the President and of the Museum Committee, the Conservator has invited Mr T. B. Layton, F.R.C.S., to help him in preparing a descriptive catalogue. The collection in its finished form will be placed in the upper gallery of Room II., adjacent to the Cheatle Collection illustrating the anatomy of the middle ear and mastoid."

* * *

Dr Hermann Krause, a prominent exponent of Laryngology in Germany in the latter part of the nineteenth century, died on the 8th August last in his seventy-third year.

For a considerable period prior to his death, he had taken no active part in the work of his profession, consequently his personality is less known to the younger members in the specialty than to those now occupying senior positions. As the result of his experimental researches, Krause was able to define the area in each cerebral cortex which represents the adductor movements of the vocal cords. Working as he did, during a period when active interference in tubercular lesions of the larynx was more orthodox than it is to-day, his name became associated with the treatment of tubercular ulceration by the local application of lactic acid and with the use of the double curettes which he introduced for the removal of laryngeal infiltrations. In his researches in connection with ozæna, he was the first to draw attention to the appearance of fatty degeneration in the glandular tissues of the nasal mucous membrane.

* * *

The Council of the Royal College of Surgeons of Edinburgh has awarded the Quadrennial Liston Victoria Jubilee Prize to Dr John Smith Fraser for his work upon the Pathology of the Labyrinth.

The Journal of Laryngology and Otology

(Founded in 1887 by MORELL MACKENZIE and NORRIS WOLFENDEN)

EDITED BY

A. LOGAN TURNER AND J. S. FRASER

ASSISTED BY

DOUGLAS GUTHRIE AND IRWIN MOORE

1. Original Articles are accepted on the condition that they have not been published elsewhere.

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5. Authors of Original Communications on Oto-Laryngology in other Journals are invited to send a copy, or two reprints, to the *Journal of Laryngology*. If they are willing, at the same time, to submit their own abstract (in English, French, Italian, or German) it will be welcomed.

6. Editorial Communications should be addressed to "EDITORS, *Journal of Laryngology*, c/o Messrs OLIVER AND BOYD, Tweeddale Court, Edinburgh."

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CONTENTS

	PAGE
THE MECHANISM OF THE COCHLEA, WITH SPECIAL REFERENCE TO THE INERTIA OF THE CONTAINED FLUIDS. George Wilkinson, M.B., F.R.C.S.	557
THE OPERATIVE TREATMENT OF OZÆNA. Dr Max Halle, Charlottenburg	567
THE VENTRICLE STRIPPING OPERATION ON MAN. Michael Vlasto, M.B., F.R.C.S.	573
CLINICAL RECORD—	
A Case of Revolver Bullet in the Sigmoid Sinus. E. D. Dalziel Dickson, M.B., Ch.B.	575
SOCIETIES' PROCEEDINGS—	
Royal Society of Medicine—Section of Laryngology	577
ABSTRACTS—	
Ear	585
Nose and Accessory Sinuses	590
Peroral Endoscopy	591
Miscellaneous	593
REVIEWS OF BOOKS	594
LETTER TO THE EDITORS	597
GENERAL NOTES	598
INDEX	603

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THE MECHANISM OF THE COCHLEA, WITH SPECIAL REFERENCE TO THE INERTIA OF THE CONTAINED FLUIDS.*

By GEORGE WILKINSON, M.B., F.R.C.S.

DR A. A. GRAY, in his lucid summary of the various theories of hearing which appeared in the August number of the *Journal of Laryngology*, stated that the solution of the problem of sound perception does not appear to be any nearer in spite of the amount of thought and research devoted to the subject during the last twenty or thirty years, and he suggests, possibly not quite seriously, that the time and energy devoted to these speculations have been greater than is justified by the practical value of the subject. Still, there can be no question that the problem of how we hear is one of the most fascinating in the whole realm of biology, and that it will always attract workers, until some generally accepted conclusion is arrived at.

One cannot help feeling that, in depreciating the value of recent work on tone perception, Dr Gray does himself an injustice. Amongst the conflicting views and theories which have been put forward the issue may seem more confused than ever, but his observation of the progressive increase in volume of the external ligament from apex to base of the cochlea is surely of the very greatest value, and imports into the discussion an incontrovertible fact with which every protagonist must reckon. It proves, as clearly as can be proved from purely anatomical evidence, that there is progressive

* The manuscript of this paper was received for publication on 26th August 1921.—EDITORS.

George Wilkinson

increase of tension in the fibres of the basilar membrane from the apex to the base of the cochlea.

In this short paper it is not the writer's intention to discuss, other than incidentally, the bearings of the various theories of hearing. He accepts provisionally the Helmholtzian theory of sympathetic resonance, especially in the amplified form given to it by Dr Gray, and his aim is to draw attention to one of the factors essentially present in every vibrating body which seems to him to have received scant attention so far as the cochlea is concerned. The factors which determine the period of vibration of any vibratory body are the length of the vibrating segment, its tension, and its mass.

Helmholtz and the earlier workers, Henle, Hensen, and others, concerned themselves only with the variations of one of these factors, that of length, and Helmholtz adduced the progressive increase in length of the fibres of the basilar membrane from base to apex of the cochlea as an argument for the progressive differentiation of the structure into a series of resonators. When, in 1900, Dr Gray showed further that the tension of these fibres also varied progressively in the same sense as the variations in length, *i.e.*, that the shorter fibres were also the tenser, and the longer the looser, he added very valuable confirmation to this contention. Every tense string possesses its proper period of vibration. If the tension and the length vary, these periods will also vary. If the variation is progressive, the periods of vibration will also be progressive, and will extend continuously over a longer or shorter scale. If an oscillatory force of the same period as that of one of the fibres acts on the cochlea, that fibre will vibrate sympathetically. It may be made to vibrate at another rate of frequency than its proper period by a compelling force, but it will impose resistance to such forced vibration. It is not even necessary for the fibre to be elastic. Elasticity does not enter into the contract. So long as the fibres are tense they must have a definite periodicity.

On the other hand, they may be so fixed that they cannot vibrate at all, or so bound together that they cannot vibrate independently, or they may be subjected to such compelling force that they are obliged to vibrate without regard to their proper periods. The opponents of the sympathetic resonance theory base their belief in the necessity for an alternative explanation on the supposed existence in the cochlea of one

The Mechanism of the Cochlea

or more of these factors. Each and all of these alternative theories have to reckon with the consideration that, though it perhaps cannot be shown that the basilar membrane is completely differentiated for the purpose of sympathetic vibration over a range of nine to eleven octaves, yet the differentiation that it undoubtedly possesses must oppose a serious obstacle to the cochlea functioning in any other manner.

Supposing it be assumed, as indeed there seems full ground for doing, that the various transverse sectors of the basilar membrane are differentiated in their periodicity in a regularly progressive manner, it is still doubtful whether that range of periodicity lies within the limits of audible tones, or whether it extends over the whole audible scale, *i.e.*, some nine to eleven octaves.

One of our greatest stumbling blocks in an attempt to visualise to ourselves the mode of action of the cochlea, is the minuteness of the scale on which it is constructed, so different to that of the bulky stringed instruments with which one is familiar, such as the string-board of the piano, the analogy of which to the series of basilar fibres is so useful for general purposes of illustration. Nor can we apply the formula for vibrating strings $n = \frac{1}{2l} \sqrt{\frac{t}{m}}$ because, though we know the range of values for n (*i.e.*, the limits of audible tones) and for l (varying breadth of the basilar membrane) we have formed no conception of the values of t or m .

I wish to offer some suggestion as to the range of values for m in the formula. If this can be approximately determined, the range of values for t can be deduced.

m represents the mass of unit length of the vibrating element. From the microscopical appearances of the basilar membrane, there does not appear to be much actual difference in its thickness at various levels. But m in the formula does not merely represent mass of unit length of the actual string, or vibrating segment of the basilar membrane, but of everything that moves with the string or segment.

The formula as it stands is only applicable to strings vibrating in air or *in vacuo*. The fact of the strings being immersed introduces other factors.

To return for a moment to the analogy of the piano string-board, we note that the strings low in the scale are longer, looser, and heavier than those higher up. To add to their

George Wilkinson

mass the lowest bass strings are wound with copper. They are *loaded* to give them additional mass. The strings of the basilar membrane are loaded in so much as they cannot move without at the same time moving Corti's organ, the mass of cells adhering to the basilar membrane, and a quantity of the endo- and peri-lymph.

What is the mass of the load? Suppose a small transverse sector of the basilar membrane* to move from its central position towards the scala tympani. Its movement will displace a certain amount of fluid, and the displacement will travel along the scala till the membrane closing the round window is bulged to a similar extent. A quantity of fluid

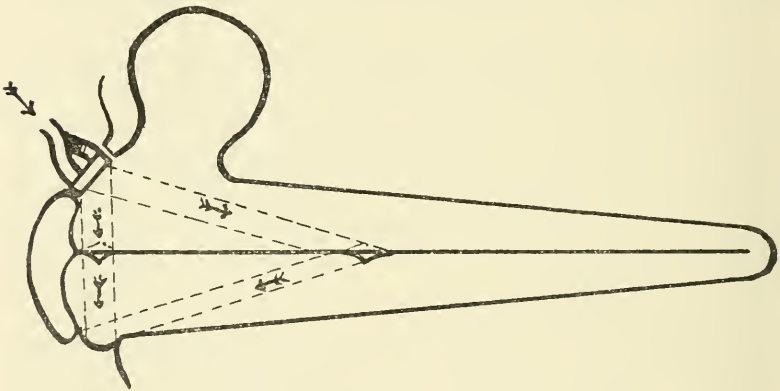


Diagram representing the cochlea unrolled. The two scalæ are shown divided by the basilar membrane. Two sectors of the membrane are represented as vibrating. The fluid enclosed between the dotted lines represents the "load" in each sector.

equal to that displaced by the movement of the sector of the basilar membrane will be displaced across each cross section of the scala from the level of sector to the round window. A similar quantity of fluid will be displaced in the opposite direction in the scala vestibuli. The result will be the same whether the movement originates from an impulse applied to the stapes (forced vibration), or vibratory movements of the sector itself (free vibration). No sector can move without a simultaneous movement of the cochlear fluid. The mass of the fluid moved is quite definite and invariable for each sector. It does not depend on the amplitude of the movement.

* It is preferable to speak of a transverse sector of the basilar membrane than of basilar fibres, to avoid giving the impression of fibres of the basilar membrane moving independently.

The Mechanism of the Cochlea

This only affects the amplitude of the displacement of fluid, not its mass.

The mass of fluid moved may be defined as that of a double column of fluid, the base of which is equal in area to the surface of the sector, and the length to the sum of the distances of the sector from the round and oval windows. The mass of the sector itself, with its adherent organs and cells, will be inconsiderable as compared to that of the fluid which constitutes the load. Its specific mass will not differ greatly from that of the fluid in which it is immersed. The whole mass may therefore be reckoned in terms of that of the column of fluid. The fluid itself has a specific mass not greatly differing from water. In centimetre-gramme units the mass will be equal to the volume of the double column.

As m is mass of *unit volume*, it will not vary with the variations in transverse breadth of the basilar membrane. For sectors of the same width it will vary only with the distance of the sector from the round and oval windows. In other words m progressively increases from base to apex of the cochlea. This will cause a differentiation in the periodicity of vibration of the sectors in the same sense as the variations in length and tension. The load is greater on the sectors that are longest and least tense.

Helmholtz recognised that the basilar fibres were "loaded," but he did not attempt to estimate the magnitude of this factor. He says, "The fluid in both galleries of the cochlea must also be considered as weighting the (basilar) membrane, because it cannot move without a kind of wave motion in the fluid." *

The writer pictures to himself the cochlea as a series of resonators, each resonator consisting not only of a transverse strip of the basilar membrane, but also of a double column of fluid from the strip to the oval and round windows.

Some such view seems to be in the mind of Lehmann,† though he approaches the problem from a different angle. Only the latter part of the quotation has bearing on the matter in hand, but for sake of clearness the whole paragraph is given. He says, "Only the part of the basilar membrane which has the period of oscillation of the oval window will regularly make room for the fluid displaced by the latter. Parts nearer will be

* Ellis' *Translation of Helmholtz, Tone-perception*, p. 148.

† Cf. Watt, *Psychology of Sound*, p. 160.

George Wilkinson

bulged out first, but they will clash with the period of the stirrup at once, and so the fluid displaced will be pushed onwards till it gets to the part in tune with the motions of the stirrup. Then the oval window, the round window, *and the column of fluid between these windows and the basilar membrane will pendulate synchronously*, and any vibration of other parts will be damped out."

The formula for vibrating strings $n = \frac{1}{2l} \sqrt{\frac{t}{m}}$ when applied to the transverse sectors of the basilar membrane becomes $n = \frac{1}{2l} \sqrt{\frac{t}{db}}$, where d is the sum of the distances of the sector from the round and oval windows, and b is the width of the sector.

If this formula be accepted as correct, it becomes possible to calculate approximately the maximum and minimum values of t at the proximal and distal end of the basilar membrane respectively.

Take the proximal end first. Its proper period of vibration will correspond to the upper limit of audible tones, which we may take at, say 30,000. It is situated right between the oval and round windows, so that d will be the distance separating the windows, which may be taken approximately at 2 mm. We can give b any value we choose, so long as it is small. Call it .1 mm. l equals the width of the basilar membrane at this point, which may be taken at .16 mm.*

$$\begin{aligned} \text{Let} \quad n &= 30,000 \\ l &= .016 \text{ (cm.)} \\ d &= .2 \text{ (cm.)} \\ b &= .01 \text{ (cm.)} \end{aligned}$$

$$n = \frac{1}{2l} \sqrt{\frac{t}{db}}, \quad \text{or} \quad t = n^2 4l^2 db$$

$$\begin{aligned} t &= 30,000^2 \times 4 \times .016 \times .016 \times .2 \times .01 \\ &= 1843.2 \text{ dynes, or} \end{aligned}$$

1.86 grams weight, or approximately 30 grains to a strip $\frac{1}{16}$ mm. broad.

Or if the strip were taken to be 1 mm. broad, the tension on it would be ten times as much, *i.e.*, 18.6 grams, or approximately two-thirds of an ounce.

* For measurements, *cf.* Sir Arthur Keith, Wrightson and Keith, p. 189 and p. 260.

The Mechanism of the Cochlea

For the lower limit, we may give n the value 32; l .52 mm. or .052 cm., b as before .01 cm. The value to be assigned to d is uncertain. According to Sir Arthur Keith the length of the unrolled basilar membrane may be taken at 35 mm. The shortest path from the terminal strip of basilar membrane to the foramen ovale and foramen rotundum will, however, be considerably less, as it will follow the inside of the curve of the spirally wound scalæ. At a guess we may take it as 2 cm. for each gallery, 4 cm. in all.

$$t = n^2 4 l^2 d b$$

$$t = 32 \times 32 \times 4 \times .052 \times .052 \times 4 \times .01$$

$$= .44 \text{ dynes, or } .46 \text{ milligrammes weight for a strip } .1 \text{ mm. wide, or for a strip 1 mm. wide } 4.6 \text{ milligrammes, approximately } \frac{1}{14} \text{ grain weight.}$$

Of course the above calculations can only be taken as rough approximations. The only reason for making them is to apply a crucial test to the writer's thesis.

If the result had worked out to impossible figures, *i.e.*, if the maximum tension were obviously greater than the basilar membrane, and its supporting structures could withstand without giving way, or the minimum approached the infinitesimal, it would show that there was fallacy in the thesis, or in the hypothesis of tone analysis by sympathetic resonance on which it rests. If, on the other hand, as it seems to the writer, the figures arrived at fall within the limits of the possible, though one cannot claim that the result gives positive support to the writer's contentions, they have a certain negative value in that the thesis survives the first most obvious test that can be applied to it.

There are many difficulties and objections which occur to the writer, as no doubt they will to others, which it is not possible to enter into in the limits of this short paper. None of them appear to him to be insuperable. The point raised by Dr Gray in his paper is likely to be quoted against me, so I will briefly refer to it, *viz.*, the fact that in certain animals the cochlea is not a closed cavity, communicating with the outside at the oval and round windows only, but that in them the aqueductus cochleæ is a wide open canal. He goes on to say, "Where the aqueduct of the cochlea is sufficiently wide open to allow the changes in pressure in the labyrinth resulting from the vibratory movements of the stapes to escape freely into the cranial cavity,

George Wilkinson

then it is clear that a considerable proportion of the force of these vibrations will be lost so far as the cochlea is concerned."

For those writers whose minds are concerned only with questions of change of pressure in the cochlea, Dr Gray's statement will give pause, but when we come to consider movements within the cochlea resulting from changes of pressure, we have to reckon with inertia of the contained fluids, and the problem is entirely altered. It is true that alterations in pressure at any point on the surface of an enclosed mass of fluid are transmitted to every other point on the surface, but any movement resulting from the force thus applied will be in the direction of least resistance, *i.e.*, in the case of the cochlea, movement will take place between the oval and round windows only. It will not be along the aqueduct of the cochlea, because any displacement of fluid along this route would transmit itself to another closed cavity, the cranium, from whence an equivalent amount of fluid would have to be displaced *viâ* the venous sinuses to the outside of the skull to make room for it. This would be equivalent to setting in movement a column of fluid from the foramen ovale to the jugular foramen. Displacement of fluid in this direction would also be resisted by tension of the dura mater, walls of sinuses, and by the pressure of blood in the jugular vein. No doubt if the pressure were a continuous one, fluid would be displaced by the cochlea along the aqueduct, and pressure would fall. With a rapidly oscillating pressure there is no time to "get way on" larger masses before the direction of the pressure is reversed.

The same factor of inertia makes it a difficult matter to convert a rapidly alternating air pressure acting on the membrana tympani or on the oval window into a to and fro movement of the cochlear fluids. The amount of movement resulting from a single impulse must be small even for sound waves of low frequency. For high pitched sound it must be very small, as the amplitude of the movement is inversely as the frequency, when the intensity of the movement is the same (intensity here means energy content). It will be $\frac{1}{1000}$ times less for vibrations of 30,000 per sec. than it will be for those of 30 per sec. (supposing the amount of cochlear fluid moved to be the same). Such an enormous range of amplitude of movement, arising from pitch of the sound waves alone, and without considering the further range of amplitude arising

The Mechanism of the Cochlea

from variations of intensity of waves of the same period, seems to be difficult to fit into the scheme of any of the theories of hearing based on the elaborate analysis of movements in the cochlea produced by *single* impulses. If the sense of sound is awakened by movements of the cochlear fluid acting on the sense organs within the cochlea, it seems difficult to believe that these will respond to movements of an amplitude so immensely discrepant.

If we accept the "sympathetic resonance" hypothesis, this difficulty disappears, as do so many others. We picture the rapidly alternating impulse finding out a path for itself in the cochlear fluid, along which, movement will occur in the same direction and in the same period as itself. This causes the infinitesimal amplitudes of each single impulse to be summed together till they attain a definite and tangible magnitude sufficient to stimulate the special sense organ associated with that particular path. It has been the aim of the writer to suggest what exactly constitutes these resonating elements within the cochlea. In his view each one comprises not only a transverse strip of basilar membrane at one particular level, but also a double column of fluid between the strip and the oval and round windows.

It is conceivable that it might be possible to devise an apparatus, on the basis of the formula $n = \frac{1}{2l} \sqrt{\frac{t}{db}}$, which would respond by resonance to vibrations of varying frequencies, as one pictures the sectors of the basilar membrane doing, though no doubt the technical difficulties of constructing such a working model are very considerable.

NOTE.—The upper limit of tension for the basilar membrane as calculated above, viz., 18.6 grams to a strip 1 mm. wide may appear to some to be in excess of what could be supported by a membrane only 3μ thick. The sectional area of such a strip is .003 sq. mm. In order to test this, I have made a few experiments on the breaking strain of various animal fibres. The results are as follows:—

A silkworm gut thread .16 mm. in diameter (sectional area .019 sq. mm.) withstood a strain of 1008 grams, but broke under a strain of 1013 grams.

A human hair .07 mm. in diameter (sectional area .00385 sq. mm.) withstood a strain of 77.5 grams, but broke under a strain of 78.5 grams.

George Wilkinson

A human hair .057 mm. in diameter (sectional area .0025 sq. mm.) withstood a strain of 70 grams but broke under a strain of 71 grams.

A human hair (child's) .052 mm. in diameter (sectional area .0021 sq. mm.) withstood a strain of 37.5 grams, but broke under a strain of 38.5 grams.

A strand of tendon from a mouse tail $.067 \times .045$ mm. (sectional area .003 sq. mm.) withstood a strain of 69 grams, but broke under a strain of 70 grams.

For comparison with the strip of basilar membrane one can readily calculate the breaking strain of each material for a sectional area of .003 sq. mm.

For silkworm gut	.	.	.	.	159 grams
Human hair	.	.	.	.	$\left\{ \begin{array}{l} 60 \text{ ,,} \\ 84 \text{ ,,} \\ 52 \text{ ,,} \end{array} \right.$
Mouse-tail tendon	.	.	.	.

The conclusion is that the basilar membrane could readily withstand the maximum tension calculated according to the formula, supposing the material of which it is composed to have a tensile strength at all comparable to that of silkworm gut, human hair, or mouse-tail tendon.

THE OPERATIVE TREATMENT OF OZÆNA.

By DR MAX HALLE, Charlottenburg. Abridged translation from the *Archiv für Laryngologie u. Rhinologie*, Bd. 33, by Dr James B. Horgan, Cork.

NO attempt is made in this paper to add to or controvert any of the various theories as to the etiology of ozæna, though special attention is drawn to the studies of Lautenschläger and to the theory and therapy which he has founded upon his investigations.

Lautenschläger accepts Grünwald's view that the disease originates in an infection of the nasal sinuses in youth, more especially in the maxillary antrum, and that the pathological changes which occur in the bones and mucous membrane, the atrophy and the crusting, are of secondary occurrence.

Acting upon this supposition, Lautenschläger advances the lateral nasal wall towards the middle line and removes the antral lining whether macroscopic evidence of disease exists there or not. In order to obtain a healthy lining to the antrum, he inverts as large a portion of the oral mucous membrane as possible into the denuded cavity and plugs for as long a time as possible so as to induce a thorough saturation (*Safidurchtränkung*) of the bone. Recently he advises the inversion of Stensen's Duct, so that the resulting continuous flow of saliva may afford a further stimulus to the bone. This practice has also been advocated and carried out by Wittmaack, but Lautenschläger's technic differs in that he maintains the opening between the mouth and the antrum and so permits the saliva, which is only intended to moisten the walls of the antrum, to find its way once more into the mouth cavity.

The Author's limited experience of this practice has forced him to the conclusion that the discomforts resulting directly from the operation are too great, and he has accordingly given it up.

Whilst duly crediting Lautenschläger with the valuable investigations which he has carried out relative to the etiology and therapy of ozæna, the Author is inclined to question the correctness of his deductions. He is unable to explain why a minority of the antral infections of childhood lead to ozæna,

Max Halle

whilst the majority result in the typical empyema. Lautenschläger's theory must be further questioned owing to the fact that ozæna is almost invariably bilateral, that it predominates in the female sex and is most frequently seen amongst the children of the poor.

As regards the microscopic changes in the membranous and bony walls of the antrum which Lautenschläger has proved to exist in these cases even in the absence of macroscopic evidence of disease, the Author would question whether these changes are *post hoc* or *propter hoc*.

Lautenschläger further holds that the ethmoidal and sphenoidal sinuses are only rarely responsible whilst the frontal sinus is never at fault.

Patients who have been operated on and demonstrated by Lautenschläger show for the most part satisfactory improvement, and in some cases remarkable improvement. There is a great or an entire disappearance of the typical and offensive odour, crusting is diminished or ceases, and the psychical improvement is pronounced.

The Author holds that as good or even better results than those obtained by Lautenschläger may be achieved by a modification of the latter's operation: it will obviate much of the complicated technic which he advocates, and it permits of a relatively simple after-treatment.

He discards as entirely superfluous Lautenschläger's latest modification, viz., the inversion of Stensen's duct. The large fistula between the mouth and the antrum is sufficient to ensure that the gauze filling the antrum is kept moist by capillary action, while saliva is also forced into the cavity during each act of deglutition.

After Lautenschläger had brought his method before the Berlin Laryngological Society in 1917, it occurred to the Author that every aim which the former desired to achieve might be obtained by the simpler and more direct line of approach advocated by Canfield-Sturman for the purpose of controlling and curing a diseased maxillary antrum. Experience has proved the correctness of this supposition; moreover, the method now to be described is very easy of execution. It has been carried out in this manner for more than two years, and has been found to be in every way satisfactory for attaining the end in view.

The Operative Treatment of Ozæna

HALLE'S DESCRIPTION OF HIS OPERATIVE TECHNIC.

Local anæsthesia is obtained by the application of a 10 per cent. solution of cocaine to which a few drops of adrenalin solution has been added. Injections of a $\frac{1}{2}$ per cent. solution of novocain with adrenalin are made in the mucous membrane of the septum, the floor of the nose, the lateral wall of the nose, and the mucous membrane located anteriorly to the turbinals. The facial walls of the maxillæ are similarly infiltrated, and, if feasible, block anæsthesia is obtained by injecting the same solution in the sphenomaxillary fissure.

The operation may be started after an interval of ten minutes. The mucous membrane covering the medial aspect of the lower turbinal should be freshened up with a scalpel or sharp spoon, without however destroying any of the mucous membrane. The mucous membrane covering the contiguous surface of the nasal septum is treated in a similar fashion. A vertical incision is now made through the mucous membrane covering the lateral nasal wall. This runs immediately in front of the middle and inferior turbinals and is carried right down to the bone. The lower end of this incision is continued on to the floor of the nose, which it crosses in a horizontal direction to end at the nasal septum immediately behind and running parallel to the *apertura pyriformis*.

The mucous membrane and the periosteum of the nasal floor are now elevated with a fine elevator, medially as far as the septum and laterally to slightly beyond the border line dividing the floor of the nose from the lateral nasal wall. Now, following the line of the incision in the mucous membrane a slender chisel of the West pattern is used to chisel through the bone. In order to avoid splintering, it is advisable to use the chisel at first gently throughout the whole length of the incision rather than to go straight through at any one spot. Finally the lateral nasal wall is chiselled through at its junction with the floor of the nose. The latter is carried out beneath the mucosa, the chisel being inserted into the pocket formed by elevating the muco-periosteum from the nasal floor.

The mobility of the lateral nasal wall being assured, it is then displaced inwards forcibly and *en masse* by means of a blunt elevator introduced into the antrum from in front. In doing this special attention must be given to the upper or middle turbinal region. It is now possible to survey the

Max Halle

greater part of the interior of the antrum. In the event of its appearing normal, the lining membrane is not interfered with, though if desired a portion may be removed for microscopic examination. If Lautenschläger's example is to be followed it should be removed in its entirety, a procedure which may be readily carried out through the opening made. If necessary a small portion of the projecting margin of the *apertura* may be resected to facilitate this end.

After the lateral wall has been forced inwards it forms a sharp angle with that portion of the lateral nasal wall still remaining. Working through this opening it is an easy matter to control the ethmoidal labyrinth. The same opening is also used for the immediate and subsequent insertion of a length of iodoform gauze. This is employed to ensure the continued medial apposition of the inferior turbinal to the septum pending the formation of adhesions to the desired extent.

Owing to the abnormal tendency to hæmorrhage in these patients the gauze plugs are not removed for five days. Experience teaches that this is not attended by any unusual discomfort. Danger to the ear is as little to be feared as when a similar plug is used in the nose in other conditions. Middle ear complications are usually only to be feared in the event of much false sneezing being indulged in after the removal of the plugs. It is therefore necessary to give warning about this possibility in every case.

The Author claims that by his method of operating in these cases he obtains as good results as Lautenschläger. The lateral nasal wall is displaced inwards *in toto*, and to the greatest extent where the nasal passage is widest. The mucous membrane of the floor being both elevated and carried towards the middle line, must by its displacement form a bolster-shaped swelling in the inferior and widest part of the nose. This, it is claimed, is equivalent to the insertion of bony splinters beneath the mucosa as practised by Lautenschläger.

Owing to the improvement that notoriously takes place in these cases at the inception of any form of treatment the Author is not in the habit of criticising his post-operative results until at least a year has elapsed since the operation.

At the time that this paper was written the Author had operated upon seventy-six ozæna patients, thirty-two in the last

The Operative Treatment of Ozæna

year, and nineteen in the previous six months. Of these cases, therefore, he adjudicates upon forty-four. These have been exhibited at the Berlin Laryngological Society, and have been seen by his assistants and guests.

There can be no doubt that the success obtained has been better than had been hoped for and that it was to a large extent a brilliant one. The typical ozæna fœtor disappeared completely or almost completely in a large number of the cases even though the patients entirely ceased to wash out the nose.

But the continued necessity of douching the nose must not of itself be considered a sign of failure in these cases. In a certain proportion of the cases it may still be required if drying up of the secretion with resultant fœtor is wholly to be avoided. If this factor be eliminated in forming our judgment a far-reaching success is to be expected in almost every case. Most cases are relatively, and a great many completely, cured.

It is astonishing to observe the post-operative changes that take place in the mucosa. It tends to approximate to the normal so closely in appearance that without any other aid it would be difficult to recognise the primary affection. The Author has frequently assumed the presence of a hypertrophic condition upon making a chance examination in one of his patients some time after operation. The patients' subjective symptoms show extraordinary improvement and the psychological elevation is no less marked. Four of the Author's patients volunteered the information that a long-lost olfactory sense had returned.

Not a few of his patients, when undergoing control examinations, assured the Author that they had not douched the nose for over six months. Yet neither the Author nor any of his assistants could detect any of the typical ozænatous stench.

The adhesions are left undisturbed for as long a time as possible, even should respiratory obstruction be complained of. The initial extensive reactionary swelling recedes in time, though to what extent one cannot at first predict. It is therefore better to allow the altered relationships of the parts to become consolidated at first. There generally remains a sufficiently large respiratory space. If not, it is a simple matter at a later date to divide the adhesions and eventually to lateralise the turbinal. In any case it is inadvisable to yield up prematurely the marked meatal stenosis which has been obtained.

The Author cites the surgical treatment of the cases operated

Max Halle

upon by Schönstadt, who implants pieces of tibia through an oral incision, and by Rohr who implants small plates of paraffin in like fashion, but points out that they only fulfil Lautenschläger's principles inasmuch as they cause narrowing of the lower meatus.*

The time is still too short and the number of patients operated on is too small to pass a final judgment, but by this relatively small operation more has been achieved than by any previous therapeutic procedure.

* *Archiv für Laryngologie u. Rhinologie*, Band 33.

THE VENTRICLE STRIPPING OPERATION ON MAN.

By MICHAEL VLASTO, M.B., F.R.C.S., Surgeon to the Throat and
Nose Department at Queen's Hospital for Children.

MEMBERS of the Laryngological Section of the Royal Society of Medicine have been in the habit, from time to time, of showing cases of bilateral abductor paralysis of the larynx. The usual discussion is invited on the appropriate method of treatment, and the stereotyped advice has been forthcoming that early tracheotomy is the best and only method of obtaining relief.

Our interest in this subject has recently acquired a fresh impetus by virtue of a suggestion brought forward by Professor Hobday at a meeting of the Section of Laryngology held on 1st April 1921. Mr Hobday's suggestion was based on the fact that he had, for a considerable number of years, been performing an operation on horses for the relief of laryngeal stridor due to paralysis of the left vocal cord. The technic of the operation was well described in a paper read at the Summer Meeting of the Section of Laryngology on 3rd June 1921, and published in the August number of the *Journal*. The question raised by him was, whether the principles involved in his operation could be applied for the relief of laryngeal stenosis in man, due to abductor paresis.

The object of this paper is briefly to summarise the results of my enquiry into the practicability of carrying out in man an operation similar to that of Professor Hobday's on the horse. The conclusions at which I have arrived were based, partly on dissections of the larynges of the horse and man (some of these were passed round at the Meeting referred to) and partly on operations carried out in the post-mortem room. The problem to be solved is briefly this. Can we, by stripping the ventricle of the larynx, produce raw surfaces which, by their union and cicatrisation would draw the vocal cords aside and thereby increase the rima glottidis. My investigations lead me to believe that the answer is in the negative.

The ventricle and sacculæ in the horse differ anatomically from those in man, and what is practicable in the former is not practicable in the latter.

In man the ventricle is a shallow depression which slightly

Michael Vlasto

undermines the false vocal cord but not the true. Under cover of the most anterior part of the false cord is the aperture of the mouth of the sacculæ.

In the horse the ventricle and sacculæ form, so to speak, one large bag, which inferiorly clothes the outer surface of the true vocal cord. Hence in Hobday's operation the ventricle and sacculæ are stripped together, leaving two comparatively large raw surfaces to adhere to each other, and to act directly on the true vocal cord. The attachments of the ventricle and sacculæ are extremely loose, and the whole structure can be everted with the greatest ease.

In man, however, the sacculæ is a small diverticulum of the ventricle which passes upwards in no relation whatsoever to the true vocal cord. It is closely invested by the sheaths of the thyro-epiglottidean and thyro-arytenoidean muscles and is extremely difficult to evert even if it were expedient to try to do so.

I submit, therefore, that excellent as the operation may be in the horse, it finds no application theoretically—at any rate—in man.

CLINICAL RECORD

A CASE OF REVOLVER BULLET IN THE SIGMOID SINUS

By E. D. DALZIEL DICKSON, M.B., Ch.B., Capt. R.A.M.C. (S.R.),
Officer i/c Nose and Throat Department, 82 General Hospital.

THE following case presents some interesting features, and may therefore be placed on record.

The patient, a sailor, E. E., aged 25, was admitted to the surgical division of 82 General Hospital with the following history:—On 23/3/20, about 4.30 P.M., patient was drunk and lying in his billet (Novorossisk) when he was hit by a spent bullet fired from outside. He became unconscious and remained so until next morning. He was taken the same night on board a hospital ship. He cannot remember details of the incident owing to his inebriated condition.

On 24/3/20 he complained of pain in the right ear and over the whole of the mastoid region and right side of the face. He was evacuated the same day to Constantinople and admitted. He was X-rayed, and as it was seen that a bullet was lying in the mastoid region he was sent to my department for further treatment.

30/3/20.—*Examination.*—The symptoms which the patient presented were headache, pain in the ear, noises and giddiness and tenderness over the mastoid. Temperature was normal; no facial paralysis. There was an entrance wound, healed, about one inch below the lobule of the right ear: no exit wound was seen. The right tympanic membrane was indrawn and showed some injection along the handle of the malleus. Hearing was good; mastoid tender; no œdema; no nystagmus. Patient was sent for re-examination by X-ray. An antero-posterior and lateral view were taken. The accompanying photograph shows the position of the bullet. As no localiser was available it was impossible to determine the depth from the surface. No fracture of bone was seen. The nose of the bullet pointed in the direction of the wound of entrance. It appeared to be behind the internal auditory meatus somewhere in the region of the antrum.

It was decided at first to wait and see how the case progressed. The symptoms, however, became worse, so it was resolved to explore with a view to finding the missile.

3/5/20.—Operation was performed under ether and chloroform. An incision was made as for the radical mastoid operation. Periosteum was elevated: the cortex was normal. The antrum was

E. D. Dalziel Dickson

opened and found healthy. Bone was removed posteriorly in the region of the sigmoid sinus. At one point a bluish tinge appeared, but not the blue one is accustomed to see in a healthy sinus. The colour was dark bronze and looked like extravasated blood. The sinus was exposed towards the jugular end, and the bullet was found lying in the sigmoid sinus. The latter was in a state of thrombosis. On removing the bullet no bleeding occurred. The parts were cleaned and the ragged ends of the sinus trimmed. No pus was found at any point. The cavity was packed with iodoform gauze and the wound stitched along almost its entire length, a small opening being left at the bottom for drainage.

4/5/20.—Patient comfortable. Temperature normal.

7/5/20.—Patient dressed, wound looks well; slight pain; drain clean on removal.

10/5/20.—Stitches removed. Parts healing well.

18/5/20.—Patient going about. The wound posteriorly was completely healed. The symptoms have disappeared, and the only complaint at present is slight singing in the ear, which is improving daily.

There are two interesting features in the case, namely, the rotation of the bullet so as to point in a direction towards its wound of entrance, assuming that it entered the body with its nose forwards; secondly, the comparatively small damage inflicted upon any important structures in the region.

The mechanism which caused the bullet to turn and point towards the wound of entrance deserves some consideration. Possibly it was travelling at somewhat slow velocity, and striking the tip of the mastoid when entering, it was turned round and travelled the remaining distance with its base upwards.

The aseptic condition of the parts, as revealed at the operation, is consistent with the history of wounds by small-bore bullets.

A CASE OF REVOLVER BULLET IN THE SIGMOID SINUS.—
E. D. DALZIEL DICKSON, M.B.



SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

SUMMER MEETING.

June 2nd and 3rd, 1921.

President—Dr W. JOBSON HORNE.

Is the Mere Enlargement of a Tonsil Good and Sufficient Reason for its Enucleation?—Mr T. MARK HOVELL (*Journal of Laryngology*, p. 457, October 1921).

DISCUSSION.

Mr WM. ROSE advocated complete enucleation. He had records of 12 cases in which a remnant of tonsil had been a constant source of trouble. Tonsillotomy was sometimes the starting-point of attacks of tonsillitis. He agreed with Mr Hovell as to the scarring which might follow enucleation.

Mr FAULDER thought that with mere enlargement without symptoms, removal of the enlarged portion sufficed. In some singers the voice was impaired even after partial removal. He did not know how scarring after tonsillectomy could be avoided. If septic tonsils were left *in situ* they were deleterious.

Sir WM. MILLIGAN considered that an enlarged tonsil was a diseased tonsil. Septic tonsils required enucleation, otherwise the crypts remained, became further infected, and caused trouble. Partial removal often necessitated the performance of a second operation. In cases of hypertrophied tonsils, the nose, mouth, and teeth required attention before operation was undertaken. In many cases dental treatment obviated tonsil operation. An enlarged tonsil might be tuberculous and partial removal would be dangerous. He had not found associated enlargement of the lower turbinates. Like Mr Hovell, he deprecated rapid operations. Haste probably accounted for much of the scarring after operation. In the treatment of hæmorrhage, he did not advocate mere suture of the pillars. The procedure caused cicatricial contraction. Though not often called for, he passed a suture under the bed of the tonsil into the superior constrictor and through the pillars, tying all the tissues together. Cicatricial contraction did not follow.

Dr WRIGHT said that where there had been recurrent attacks of peri-tonsillar inflammation, tonsillectomy was the only effective

Societies' Proceedings

operation. In large movable tonsils enucleation was as easily performed as tonsillotomy.

Mr W. STUART-LOW disagreed with Mr Hovell's views. An enlarged tonsil was diseased and should be removed. Many bad results followed their neglect. He had seen very few cases in which the voice was worse after operation.

Mr DIGGLE found it difficult to distinguish between tonsils which were merely hypertrophied and those which were diseased. In 75 cases examined microscopically and by guinea-pig inoculation, only 5 had been definitely tuberculous. They could not be recognised clinically as such, therefore enucleation was the correct operation.

Mr J. F. O'MALLEY advocated enucleation when operation was decided upon. During the tonsillotomy period hæmorrhage was more frequent and serious than after tonsillectomy. Scarring and contraction were more common in cases of recurrent quinsies and tonsillitis, independently of lesions produced at the operation.

Professor BURGER (Amsterdam) recommended tonsillotomy in children without a general anæsthetic, and tonsillectomy in adults.

Dr DOUGLAS GUTHRIE said that buried tonsils, if unhealthy, should be enucleated. The entirely projecting tonsil seen in some children could be easily removed completely by any method, snare or guillotine.

Mr HERBERT TILLEY had not used a guillotine for five years. He dissected all his tonsil cases whether the organs were diseased or enlarged: 20 per cent. of adults coming to him with chronic septic tonsils had had tonsillotomy done as children. He would like a definition of the border-line between hypertrophy and disease.

Mr HORGAN regarded scarring after tonsillectomy as the result of over-instrumentation. He corroborated Mr Hovell's remark as to the enlargement of the lower turbinals. He was surprised that no reference had been made to the valuable work of Mitchell of Edinburgh on tubercle of the tonsil.

Dr SYME said there was room for better diagnosis of tonsillar conditions. Some tonsils returned to the normal size when left alone. A nasal condition may be responsible for a septic tonsil.

The PRESIDENT understood from the discussion that the surgeon should either perform tonsillectomy or leave the case alone. He considered that size was not an indication for interference. Small, innocent-looking tonsils were often septic; if their removal was not thorough, quinsy might follow. He insisted that removal should not be made a routine matter.

Royal Society of Medicine

Mr HOVELL (in reply) said that with septic crypts tonsillectomy was the operation, but he protested against all enlargements being treated in this way. All enlarged tonsils were not diseased, and in many cases the removal of adenoids and of the projecting part of the tonsil was sufficient treatment. He believed that Sir Wm. Milligan's experience as to the rarity of scarring was not the general experience, nor could he agree with Mr O'Malley's statement as to hæmorrhage.

Operations on the Frontal Sinus—Mr WALTER HOWARTH (*Journal of Laryngology*, p. 417, September 1921).

Mr HERBERT TILLEY had not performed the Killian operation for six or seven years. He agreed with Mr Howarth that the cause of failure in many frontal sinus operations was due to outlying suppurating orbito-ethmoidal cells being overlooked. If these were more generally recognised, surgeons would have more successes. Could all the anatomical difficulties be overcome by operating from the orbital roof? He wished to know if Mr Howarth divided the supra-orbital nerve in his operation. Patients suffered for a long period as a result of its division.

Sir ST CLAIR THOMSON had not operated externally since before the war; he had adopted the intra-nasal method. When doubt and trouble arose over the ethmoidal cells, then he had been dissatisfied with intra-nasal methods. The problem of the orbito-ethmoidal cells seemed at present insoluble. Statistics were fallacious. In Killian's first eighty-six cases there were no deaths, but before he had operated upon one hundred, three deaths occurred.

Dr W. S. SYME said that ethmoidal cell suppuration, in association with frontal sinus disease, could not be dealt with save by external operation. In the main, he did the intra-nasal frontal operation, but when a case demanded more, he performed the Killian operation. All dead spaces must be opened up if cure was to be expected.

Mr O'MALLEY thought that the majority of cases of frontal sinus disease were due to backward pressure sepsis from the ethmoidal cells. The results obtained in the more recent traumatic cases were better than those in the old standing chronic inflammatory sinuses, and his own experience of Mr Howarth's method when dealing with the former type of case was satisfactory.

Mr KISCH considered that the removal of the ethmoidal cells was the essential point in dealing with the frontal sinus, and that the so-called intra-nasal operation was really an ethmoidal operation.

Mr T. B. LAYTON thought that the most important point emphasised by Mr Howarth was the statement that the mucous membrane should be disturbed as little as possible, and possibly the success which that

Societies' Proceedings

operator had obtained was due to his treatment of the lining mucosa of the sinus.

Sir WM. MILLIGAN considered that the acute or subacute cases and the chronic cases should be looked at from two entirely different points of view. In the former there was good reason for an intra-nasal operation, but in the latter such a procedure was unlikely to effect a cure owing to the disorganised state of the mucosa. He advocated the Killian operation in certain circumstances, but he removed the bridge because, if left, there was more probability of unhealthy granulation tissue forming, necessitating another operation. Preservation of the mucous membrane was desirable if there was not much disorganisation. The whole problem resolved itself into thoroughly exposing the entire septic tract and to providing proper drainage.

Sir J. DUNDAS-GRANT considered the intra-nasal operation the best in the cases where it was called for. Mr Howarth had pointed out the success of his non-disfiguring operation, which was a simpler one than the Killian.

Dr NEIL MACLAY wished to sound a note of warning in regard to the intra-nasal operation. He had had two cases of diffuse osteomyelitis following it. He was now cautious in the use of the method, and he welcomed Mr Howarth's fresh proposals for an external operation.

Mr HOWARTH (in reply) said that by his method he could remove practically the whole of the sinus, displacing the eyeball very considerably in order to do so. He did not consider the operation applicable to every case, but he obtained a pretty good view. He admitted that the galleries in the temporal region involved difficulty. He left the mucosa because it was not so disorganised as it appeared to be. He formed the impression when working in Killian's clinic, that the latter's operation was not a satisfactory one. He believed that the operation now described did expose the whole of the septic tract.

The Usual Site of Origin of Intrinsic Cancer of the Larynx as demonstrated at fifty Laryngo-Fissures—Sir ST CLAIR THOMSON (*Journal of Laryngology*, p. 462, October 1921).

Mr HORGAN, from an experience of four cases of laryngo-fissure, corroborated Sir St Clair Thomson's remarks. In one case, when the growth was situated on the anterior two-thirds of the vocal cord and extended into the subglottic region, he had found operation troublesome, and he had failed to remove the tumour completely.

Sir J. DUNDAS-GRANT commented on the tendency to subglottic extension when the disease was close to the anterior commissure. He

Royal Society of Medicine

was impressed, when recently reading a French authority, by the statement that a growth at the anterior commissure was an indication for laryngectomy.

Prof. BURGER (Amsterdam) had always thought that the posterior part of the cord was the area chiefly affected. Was impaired mobility or fixation a contra-indication to laryngo-fissure?

The PRESIDENT said it was important that the laryngologist should make a careful study of the normal histology of the larynx. He should know exactly where squamous epithelium ended and columnar commenced; then one could draw valuable conclusions. One knew where epithelioma would occur, and one could state that if in a certain part of the larynx, then prognosis was favourable.

Sir ST CLAIR THOMSON (in reply) said that there were degrees in malignancy of which, at present, we knew little. He had published all his cases, and had had two deaths. Laryngo-fissure was safe if proper precautions were taken. Otherwise death occurred from hæmorrhage or pneumonia. Impaired mobility or fixation of the cord was not necessarily a contra-indication to laryngo-fissure. Some cases with fixation had survived for many years after operation.

Diathermy in Inoperable Pharyngeal and Epilaryngeal Malignancy—Sir WM. MILLIGAN (*Journal of Laryngology*, p. 369, August 1921).

Mr MUSGRAVE WOODMAN had experienced trouble with hæmorrhage, and advised preliminary ligation of the neighbouring large vessel or vessels so as to avoid it. He had found it easier to deal with columnar-celled and spheroidal-celled carcinomata than with squamous-celled growths. The latter formed a tough resistant residue. It was difficult to know the exact point at which to stop when one was coagulating tissues.

Mr WRIGHT asked for information as to the treatment of the skin incisions when dealing with secondary deposits; was immediate suture recommended? Had Sir Wm. Milligan seen necrosis of the laryngeal cartilages?

Dr DIGGLE wished to know if adhesion of the growth to bone was to be regarded as a contra-indication to diathermy.

Sir ST CLAIR THOMSON had found that tumours of the palate and pharyngeal wall were more favourable cases; in disease of the base of the tongue and epiglottis the procedure was either dangerous or difficult.

Mr RIDOUT had treated and greatly relieved an epithelioma of the right upper maxilla in a patient with high blood pressure; also a case

Societies' Proceedings

of epithelioma of the epiglottis and laryngeal pharynx after preliminary tracheotomy, and there was steady improvement.

Mr WORTHINGTON thought that diathermy should not be reserved for cases deemed inoperable by ordinary surgery, but that it should be regarded as preferable to the knife. He had treated a case in which a surgeon wished to remove the tongue: the patient was unwilling to lose his tongue. He (the speaker), after ligating the internal carotid and removing the glands, was able to complete the treatment by removing the tumour only by diathermy.

Mr WALTER HOWARTH had had considerable experience of diathermy, and he suggested "diathermy cauterisation" as a better term. In operations on the tongue or floor of the mouth, when extensive bleeding might be expected, he preferred ligation of the lingual as well as of the external carotid artery.

Mr NORMAN PATTERSON illustrated upon the epidiascope the results obtained in several cases of malignant disease of the throat treated by this method. He agreed with Mr Worthington that diathermy should not be confined to so-called inoperable cases: all cases of malignant disease in the mouth and larynx could be treated better by diathermy than by cutting methods. He was adverse to operation in stages, and preferred to ligate vessels, remove glands and the primary tumour at one sitting. Diathermy was much more than a palliative operation.

Sir WM. MILLIGAN (in reply) suggested the term "Endothermy." He thought there was a great field for the method in cases adjudged as operable in the ordinary manner. He had not had an equal success with tumours in the laryngeal pharynx. He could give no indication as to the point at which to terminate the operation: the effect of diathermy extended into the contiguous tissues. In laryngeal cases there was a danger of necrosis of cartilage. His best results were on the palate and fauces. Unlike Mr Patterson, he preferred to operate in stages. As to cure, he asked the question, when was a case of cancer cured? At any rate, patients were enabled to live comfortably, often for years.

Paralysis of the Vocal Cords Secondary to Malignant Tumour of the Mamma—A. LOGAN TURNER, M.D. (*Journal of Laryngology*, p. 373, August 1921).

Sir WM. MILLIGAN thought that paralysis due to this cause must be rare. He had only seen two cases—one homolateral, one contralateral. The paralysis in the latter occurred four and a half years after removal of the breast. He believed that there had been no enlargement of the supraclavicular glands.

Royal Society of Medicine

Mr WALTER HOWARTH had recently seen a case with right vocal cord paralysis and a mass of glands above the inner end of the right clavicle. The right breast had been removed for scirrhous.

Sir J. DUNDAS-GRANT did not think that every case of vocal cord paralysis following mammary cancer was necessarily dependent on that cancer. In one of two cases of alcoholic neuritis causing recurrent paralysis, one breast had been removed for carcinoma. Under suitable treatment the woman recovered her voice.

Mr PYKE referred to the case of a man who developed right recurrent paralysis after removal of the rectum for malignant disease. No explanation of this had been forthcoming.

Dr A. LOGAN TURNER (in reply) said that in the large general hospitals the question of subsequent paralysis after breast operations should be investigated and probably more cases would be recorded.

Observations on the Results of over 2000 Cases of Vocal Cord Paralysis in Horses treated by the Stripping of Morgagni's Ventricle—Professor F. HOBDAY (*Journal of Laryngology*, p. 422, September 1921).

Mr HERBERT TILLEY pointed out that the occasion for the ventricle stripping operation in man arose in cases of bilateral abductor paralysis, and not in the ordinary case of unilateral paralysis. In the former there was bilateral adduction, probably due to fixation of the crico-arytenoid joints. It meant, further, that the human subject had a grave intra-thoracic or a central lesion, which must be taken into account. In a small residue of cases of fixation he might consider Mr Hobday's operation.

Mr MICHAEL VLASTO had made dissections of the larynx in man and the horse. In man he had found the ventricle fixed down by the thyro-arytenoideus and the structures forming the false cord: the entrance to it was very small. He doubted whether the operation, if feasible, would be successful. In the horse moderately large raw surfaces became opposed to each other; in man, one could raw the surface of the ventricle but could only oppose it to a raw point on the true vocal cord.

Mr WORTHINGTON asked for the percentage of successes in Mr Hobday's last 500 cases. He suggested experiments on animals whose larynges more nearly approximated to the human type.

Mr J. F. O'MALLEY did not think that the effect of the operation on the voice was a contra-indication, because if Mr Hobday merely stripped the lining membrane of the ventricle, the approximation of the cords in phonation was not particularly interfered with.

Societies' Proceedings

The PRESIDENT expressed his interest in the pathogenesis of the condition in horses. He had examined the larynges of these animals thus affected and had found mainly an atrophy of the nerve. It was a neuropathic condition: it might be produced by the tugging movements of the aorta upon the nerve when the horse exerted itself. The condition occurred more often in thoroughbreds, and more often in stallions than in mares, and it seemed to be transmitted from parent to offspring.

Professor HOBDAY (in reply) said the condition was a paralysis of the left vocal cord, and it occurred in animals who were subjected to much exertion. The continual tapping of the aorta upon the nerve caused atrophy. Another theory was that the atrophy was induced by the enlargement and pressure of the glands upon the nerve in the disease called "strangles." Seventy per cent. of owners said that the horse was all right until it developed "strangles."

Bronchoscopy in the Treatment of Asthma—Dr W. S. SYME (*Journal of Laryngology*, p. 427, September 1921).

Mr A. J. HUTCHISON wished to know if Dr Syme had limited his treatment to the passing of the instrument or had also used medications, as cures had been reported after the combination treatment.

Dr HORGAN had used 10 per cent. cocaine and adrenalin combined in two cases, but in neither was there any noticeable improvement in the asthma.

Mr HERBERT TILLEY asked for an explanation of the mode of action of the treatment, seeing that these cases were anaphylactic in origin.

Dr SYME (in reply) said he had not used the bronchoscope alone. The application of adrenalin to the mucous membrane had been advocated. In his method of treatment the silver nitrate was converted into oxide of silver in the tissues, and it remained for a long time as a coating on the bronchial mucosa. Cocaine dulled the reflexes. The cases of asthma thus dealt with were so severe that he wished to bring forward his experience.

Eversion of the Sacculus Laryngis: the so-called Prolapse of the Ventricle—Paper read by Dr IRWIN MOORE (to be published later in the *Journal of Laryngology*).

ABSTRACTS

EAR.

My Method of Conservative Radical Operation. R. BÁRÁNY.
(*Acta Oto-laryngologica*, Vol. iii., fasc. 1 and 2.)

The writer describes briefly the method of which he has given a detailed account in the *Medizinischen Klinik* for 1912. He draws attention to the following points. The attic is completely exposed in all cases, and the head of the malleus is resected with scissors when cholesteatoma lies in front of it. In most cases the incus is removed, but it is retained when it is still connected with the stapes or has the tympanic membrane adherent to it. Great importance is attached to the most careful examination of the tympanic cavity and the attic. Ten minutes are usually devoted to this part of the operation, and complete arrest of bleeding is secured by means of adrenalin. The cavity is packed with three or four pledgets of gauze covered with rubber-tissue which are removed after twenty-four hours. The post-aural incision is closed excepting at the lower end where a rubber drain is inserted. After the first dressing a loose gauze drain only is placed in the meatus in most cases; in a few, however, it is necessary to have recourse to firm packing with cauterisation and curetting. In the average case healing can be promised almost with certainty, and it may also be predicted that the hearing will be, at any rate, no worse than before the operation. Every patient who has undergone a radical mastoid operation should present himself from time to time to the operator for removal of wax and desquamated epidermal scales. The ear can rarely be treated as a normal one, even after the most successful operation. THOMAS GUTHRIE.

Acute Purulent Otitis Media in Children. JAMES G. CALLISON.
(*Medical Record*, 5th March 1921.)

Acute purulent otitis media in children is practically always secondary to a naso-pharyngitis, spreading by means of infected material being forced up into the ear during the act of swallowing, coughing, or gagging, or in more severe cases by actual extension of infection along the mucous membrane. Very occasionally there may be a true hæmogenic implantation of the infecting organisms, in such systemic infections as typhoid and lobar pneumonia. The most common organism found is the *Streptococcus hæmolyticus*, next in importance is the *Streptococcus capsulatus*. Of the four cardinal symptoms of acute purulent otitis media pain, fever, discharge, and bulging of the tympanic membrane, only the last named is constantly present.

Abstracts

The most important prophylaxis lies in the removal of adenoids, for which purpose the writer prefers the La Force box adenotome. The essential treatment consists in making a free incision through the tympanic membrane, and this should almost invariably be made under general anæsthesia, and the best and safest is ethyl chloride. "The incision of the membrane should be begun by inserting the myringotomy knife deeply into the tympanic opening of the Eustachian tube and carrying the incision up across the tympanic membrane in front of the handle of the malleus, and if much inflammation, out on to the canal wall through the crucial ligament. The knife is then returned to the entrance of the Eustachian tube and the second incision is carried downward, backward, and upward behind the handle of the malleus."

The writer also advises that the naso-pharynx (even in infants) should be washed out by allowing some mild antiseptic to be instilled through the nose into the naso-pharynx.

Before incision of the tympanic membrane the use of drops is to be wholly condemned, since no absorption can take place through the skin of the canal or tympanic membrane and the actual condition tends to become masked by the altered appearance.

The ice-cap or hot-water bottle may be used to relieve pain. Following incision the canal should be irrigated every two hours, and three days later the following drops may be used for irrigation and drying:—

Tr. Iod.	℥ 15.
Ac. Carbol.	℥ 15.
Spt. Vin. Rect.	℥ ii.
Aq. dest.	ad ℥ i.

Powders for insufflation or gauze drains are useless and dangerous. The ear should be dry and healed in three or four weeks' time; if not, adenoids and possibly tonsils should be removed. Should the discharge still persist then the question of opening up the antrum and cells arises even in the absence of more positive evidence of mastoid involvement.

LINDLEY SEWELL.

Retro-auricular Drainage. C. J. A. VAN ITERSOM, Leyden. (Communicated to the *Archiv. für Ohren-, Nasen-, und Kehlkopfheilkunde*, May 1921.)

Timely establishment of retro-auricular drainage in acute otitis media leads to rapid cessation of otorrhœa and remarkable freedom from complications. Though advocated several years ago by W. C. Phillips and M. Th. Zytowitch, this method has found little recognition in the standard otological text-books.

Acute otitis media is tantamount to an abscess in the tympanic

Ear

cavity, and as such requires, in certain circumstances, the provision of a counter opening. *In cases of acute otitis media, which after thorough treatment for at least three weeks show no tendency to spontaneous healing, retro-auricular drainage is indicated.*

Popular prejudice is an obstacle to the application of this principle; nevertheless, early antrotomy is an eminently safe and satisfactory measure in acute otitis, especially when local anæsthesia is practicable.

Albert Denker is willing to postpone antrotomy for six weeks, a period during which impairment of function may become permanent. Albert Bing's dictum that a surgeon should take a pride in healing cases of acute otitis without operation is open to similar objection. Retro-auricular drainage is not a method to be adopted to the exclusion of all others; for example, repeated paracenteses as advocated by Burger and Paul Ostermann may be very satisfactory in relapsing cases.

Douglas Guthrie's plan of operating upon children if adenotomy and conservative treatment for two to three months be unsuccessful, by performing the modified mastoid operation, necessitates, at all events, a greater invasion of the ear than does simple antrotomy at an earlier stage.

Comparison in bilateral cases between post-auricular drainage and alternative methods has convinced van Iterson of the superiority of the former.

Lubet Barbon recommends operation if the tympanic perforation rapidly increases in size. Van Iterson would prefer to anticipate such enlargement.

Caboche opines that an otitis may actually originate in the antrum, and cites four cases, apparently of this nature, which healed rapidly after antrotomy.

If Dench's conception that the antrum is invariably affected in acute suppuration of the middle ear be a true one, then the method of choice in the treatment of acute otitis media, in which the conditions enunciated above are fulfilled, would appear to be the operation advisedly described as retro-auricular drainage.

W. OLIVER LODGE.

The Psychic Factor in Impaired Hearing. By Dr A. BLUMENTHAL, Berlin. (*Monatss. f. Ohrenh.*, Year 55, Vol. viii.)

In a long article of 47 pages the author emphasises the necessity of recognising irregular responses to the functional hearing tests, and urges that these must be dependent on "psychic" variations in different patients.

He commences by quoting the results of testing 37 cases in which the "finding" corresponded with the generally accepted diagnosis of deafness due to impaired "sound-conduction." A similar account is

Abstracts

given of 19 cases where affection of the auditory nerve was the only lesion. This is followed by the narration of 8 cases in which both the sound-conducting and perceptive apparatus were involved with the expected result in response to the tests.

After a further discussion on these results, he quotes 46 cases whose impaired hearing could not be satisfactorily explained either by a pure affection of the sound-conducting apparatus, a pure nerve lesion, or even a combination of the two.

As attracting notice to such "irregularities"—which certainly no one will suggest are uncommon—the article may be of use, but its value is depreciated by the apparent omission of such data as the Wassermann reaction and the elimination of alcohol, tobacco, and other possible toxic affects. Perhaps, too, "psychic" is an epithet with which many will not readily agree, although admitting that "variation in attention" and "temperament" undoubtedly influence the response to tests which at present unfortunately are dependent essentially on entirely subjective reports of the patients. ALEX. R. TWEEDIE.

Experimental Studies on the Rotatory and Caloric Tests in Pigeons.
G. V. TH. BORRIES. (*Acta Oto-laryngologica*, Vol. ii, fasc. 4.)

The author attaches great importance to the technique employed in these experiments and adversely criticises the methods of Ewald and van Rossem. The pigeon is firmly fixed in a pigeon-holder, which is attached to a revolving platform. The head is covered with a leather cap—an essential point neglected by Ewald. The pigeon thus fixed and with its head covered presents a strange phenomenon of great theoretical and practical importance. Both the head and the body remain perfectly still in the same position for hours. The bird seems to be transformed into a statue. If its head be then moved slightly to right or left, it will keep the new position indefinitely as if destitute of all power of voluntary movement. When slight turning movements of the pigeon-holder are made, it is found that the head does not follow these movements, but lags behind, keeping its axis constantly directed towards the same point in space like a compass needle. On turning the pigeon-holder a little more, for instance to the right, it is seen that the head at a certain point begins to move towards the right and then makes one or more quicker movements with the beak to the left. The author has shown by a series of experiments that this "reflex of direction" is evoked exclusively by rotatory (angular), and not at all by progressive (rectilinear) movements. Movement forward, backward, laterally or obliquely, produces no reaction, provided that the long axis of the pigeon remains parallel to its original position; while rotation extending over even a very small number of degrees of a circle gives marked head nystagmus. This

Ear

specific receptivity to rotatory movements and insusceptibility to progressive movements acts with the most minute accuracy. From these observations it is concluded that there exists a special mechanism capable of maintaining the position of the head unchanged, and of such a nature as to enable the pigeon while flying so high that the earth cannot be discerned, to appreciate the slightest deviation from its original direction. That this mechanism consists of the inertia and a special sense organ, namely, the semi-circular canal system, is proved by the disappearance of the reflex after removal of these canals.

It is well known that many birds possess an almost unaccountable sense of locality, and there has been much discussion as to the existence of a so-called "sense of direction." The author's experiments are of interest in this connection, showing as they do that a bird is able by the help of its semi-circular canal system to maintain a direction in space with complete mathematical accuracy.

The writer next discusses the hypnotic state in pigeons, the condition first produced by Kircher, in the year 1646, in the hen by drawing a chalk line before its eyes. At first sight this condition appears to be identical with that of the pigeon fixed in the pigeon-holder with its head covered. This is, however, not the case, since the pigeon with head-cap reacts only to rotatory (angular) movements, while the bird in the hypnoid state shows fixation of the head for both rotatory and progressive (rectilinear) movements. It can be shown, moreover, that this fixation for rectilinear movements depends upon the existence of binocular vision, and disappears completely when the head is covered. As a corollary of this it is important to notice that in rotation tests in pigeons without the head-cap, the post-rotatory nystagmus is influenced by voluntary and optic fixation of the head, and that, therefore, accurate rotatory vestibular experiments are impossible without the use of the head-cap. Hence the incorrectness of Ewald's observations.

Post-rotatory head-nystagmus in pigeons is recorded in the author's nystagmograms, and is capable of very accurate measurement. It is constant in normal pigeons, and is always rhythmical and follows the same rules as to direction as eye-nystagmus in man. The average duration of the nystagmus in the forty pigeons examined was found to be 16.2 seconds after turning to the right, and 16.3 seconds after turning to the left. The duration after turning to the right is always the same as that after turning to the left in the same pigeon and at the same sitting, but the absolute duration in different individuals and in different tests of the same individual shows considerable variation, though less than does eye-nystagmus in man. Rotation in both the frontal and sagittal planes also produces the normal post-rotatory nystagmus in the expected directions.

Abstracts

The "reflex of direction" above referred to was examined in thirty pigeons in various positions. It was constant for turning in the horizontal plane; slighter in the position with back down, and dubious or absent in the right or left lateral position, that is, in the plane of the external semi-circular canal. In both the frontal and sagittal planes it was either very doubtful or completely absent. After removal of the semi-circular canals this reflex disappeared for ever.

Kubo, Popp, and others, have failed to produce caloric nystagmus in pigeons. The author, however, succeeded without difficulty, the important point being the use of the head-cap. For the warm test, water at 60° was used, and for the cold test, ice-water. Of the thirty-eight pigeons examined four gave somewhat atypical results, while all the rest reacted normally. It was thus proved that caloric nystagmus is practically constant in normal pigeons as a result of simple douching of the auditory meatus, and that it follows the same rules as the eye-nystagmus in man as to the dependence of its direction on the temperature of the water and the position of the head.

On seven pigeons (that is fourteen labyrinths) bilateral removal (total or partial) of all three semi-circular canals was performed, while in one pigeon the six canals were plugged with silver amalgam. From all of these sixteen labyrinths a normal caloric nystagmus could be produced by syringing with hot or with cold water. For the first two or three weeks following the operation—possibly as a result of shock—the reaction was generally absent, but after that interval it was always present and well marked. Hence it must be concluded that the caloric reaction arises from the maculæ of the vestibule, or from the macula lagenæ. In all cases the rotatory reaction disappeared completely and permanently after destruction or blocking of the semi-circular canals.

The author intends to deal in a later communication with the theoretical consequences of these experiments.

THOMAS GUTHRIE.

NOSE AND ACCESSORY SINUSES.

A Critical Review of the Operative Treatment of Ozæna. Priv. Doz. KARL AMERSBACH. (*Archiv für Ohren-, Nasen-, und Kehlkopfheilkunde*, May 1921.)

Amersbach discusses the relative merits of certain recently devised operations for the relief of ozæna, which aim at bringing the salivary secretion into contact with the atrophic nasal mucous membrane, as compared with methods such as the implantation of fat or bone grafts submucously.

Experience of implantation of Stensen's duct into the antrum of Highmore shows that the procedure may be attended with consider-

Peroral Endoscopy

able difficulty, especially when the antrum is small and deeply situated. Other possible complications are obliteration of the new canal, and abscess formation in the parotid gland from ascending infection.

In spite of these difficulties, recorded cases show encouraging features, and open up attractive possibilities for the alleviation of this distressing complaint. One authority claims for his method that in addition to the relief of ozæna as a symptom, a restoration of the normal circulatory and nutritive conditions is brought about.

References are made to important contributions on the subject by Lautenschläger, Ortloff, and Wittmaack. W. OLIVER LODGE.

A Case of Extradural and Subdural Abscess following Frontal Sinusitis.
J. H. BRYAN. (*Amer. Journ. Med. Sc.*, November 1920.)

A boy, aged 15, had undergone operation for acute frontal sinusitis, the anterior wall of the sinus being removed and external drainage established. Two weeks later, on account of persistent discharge, the wound was reopened and a sequestrum of the posterior wall removed, exposing the dura. At a third operation, ten weeks later, no further necrosis of bone was found. The cavity was irrigated. Four hours after this operation the patient complained of severe headache, and numbness of the right hand. After a further lapse of three weeks he was seen by the writer, who found the frontal region swollen and œdematous, though there was no headache or fever. A large flap was reflected and some softened bone was scraped away. Profuse discharge continued, and on one occasion a probe was passed up as far as the vertex of the skull. There were no cerebral symptoms during this period, which continued for several months. Bacteriology—non-hæmolytic streptococcus. The wound was then allowed to close. Six weeks later the boy was brought to hospital with severe headache, frontal swelling, and temperature 103. The frontal bone, apparently healthy, was partly removed, exposing an extradural sac containing pus under tension.

The patient remained comatose, and died a week later. Post-mortem examination showed thick pus covering the left cerebral hemisphere, subdural frontal abscess and extradural abscess. Streptococci were grown from the exudate. J. K. MILNE DICKIE.

PERORAL ENDOSCOPY.

Foreign Body in the Œsophagus for Nine Months. C. H. CARROLL.
(*Lancet*, 1921, Vol. i., p. 1300.)

The body was a flat-barred safety brooch, open. The patient, a boy, aged 15 months, was brought to hospital with what appeared to be a superficial ulcer on the neck. When the scab was removed

Abstracts

a pin point was found projecting from the centre of the ulcer. X-ray showed the pin in the œsophagus. It was removed by means of the œsophagoscope and by cutting the point. MACLEOD YEARSLEY.

Congenital Stenosis of the Œsophagus. JEAN GUISEZ. (*Bulletin D'Oto-rhino-Laryngologie*, Paris, November 1920, p. 291.)

The author reviews 5 cases of this condition treated by himself. The youngest patient was four years old, the eldest thirty. In each case, there had been difficulty in swallowing, and regurgitation of food during infancy, and the patients, with one exception, had subsisted entirely on fluids. Each case had been diagnosed as spasmodic stricture, secondary to œsophagitis; these conditions existed, but were the result of the organic stricture. In every case the diagnosis was only made by direct œsophagoscopy. This showed a valvular flap occluding the cardiac end of the œsophagus, and leaving a passage, pinhole or slightly larger, guarded by a smooth edge. The œsophagus above the stricture was inflamed and dilated, and in one case its capacity was $2\frac{2}{3}$ litre. The treatment consisted in one case of internal œsophagotomy; in another of gradual dilatation; and in three, of dilatation and electrolysis. All the patients were completely relieved and continued to do well.

The author discusses the origin of this condition, which he compares to congenital stenosis of the rectum. In his view, there is a failure of complete fusion of the œsophagus and stomach, and persistence of a part of the diaphragm which should normally disappear during development. He points out further that the definite valvular flap, with a small opening at one side, can readily be distinguished from the star-shaped passage of spasmodic stricture, the non-valvular appearance of inflammation pure and simple, and the crescentic lumen of stricture due to external compression. Congenital stenosis was found in five out of 2000 œsophagoscopies.

E. WATSON WILLIAMS.

Treatment of Gangrene of the Lung by Intrabronchial Injections. JEAN GUISEZ. (*Presse Médicale*, 20th February 1921.)

The writer gives an account of 12 cases of gangrene of the lung treated by means of massive intrabronchial injections of medicated liquid. First the larynx is anæsthetised by repeated applications of 5 per cent. cocaine, and then the upper portion of the trachea by the instillation through the glottis of 2 to 3 c.c. of 2 per cent. novocaine. For this a special syringe and cannula are used, the latter being of sufficient length and with an appropriate curve to enable it to be passed between the vocal cords, and terminated by a bulbous extremity perforated by a ring of small holes. The patient

Miscellaneous

is in the sitting position and bends the body laterally with the convexity of the spinal column directed towards the side on which the lung is affected, in order to bring the bronchus of that side as nearly as possible in line with the trachea. After a few minutes the instillation of the fluid can be made. This is carried out slowly into the lumen of the trachea, and the cannula used is similar to that for the novocaine save that the orifice is single and terminal. The writer states that once the patient has become accustomed to the procedure, no cough is produced, and the whole injection is retained and can be seen by radiography to be in the bronchioles. For half an hour afterwards the patient must lie quietly on the affected side. The medication found to be most effective was 20 to 25 c.c. of "*solution huileuse goménolée*" in a strength of from 1/10 to 1/5. Menthol 1 per cent. and guaiacol 5 per cent. were tried and found less effective. The treatment was carried out every day, or more usually on alternate days, with a holiday allowed every few days by the omission of one injection.

Of the 12 cases quoted the first occurred in 1910 and the last in 1914. The writer found that as a general rule after a few injections the expectoration diminished and then disappeared along with the fœtor, the temperature sank to normal, the signs in the chest cleared up, and the general condition of the patient underwent a rapid and marked change for the better, until under the continued treatment a cure was established. Two cases suffered a relapse which yielded completely to a further course of treatment. Another case was that of an alcoholic, 59 years of age, and bilateral in the incidence of the disease. Treatment was continued for three months, till the lungs were thought to be well. Unfortunately death from pyæmia occurred just at this time, but at the autopsy the writer's view was confirmed as to the state of the lungs. In yet another case the gangrene developed at the site of a focus of active tuberculosis of old standing, with cavitation, and positive sputum. The treatment not only cleared up the gangrene but apparently acted so favourably on the older lesion that no further tubercle bacilli were found in the sputum. F. J. CLEMINSON.

MISCELLANEOUS

Observations during the Campaign, 1916-1918. A. COSTINIU, Bucharest.
(*L'Oto-Rhino-Laryngologie Internationale*, February 1920.)

Costiniu attributed a certain type of acute otitis media to heavy bombardment. There was defective hearing, tinnitus, and less pain than in the usual otitis media. All were easily cured. In the acute otitis media with suppuration, due to war trauma, *i.e.*, caused by loud explosions close to the soldier, the writer concludes that 50 per cent. of cases had normal ears before the war. In 145 cases, 33 were

Reviews of Books

subjected to the mastoid operation, the Carrel-Dakin technique being carried out afterwards. In 90 cases of catarrhal otitis media, the ground had been prepared by affections of neighbouring structures, and bombardment played the part of the determining factor. Labyrinthitis was common, the condition clearing up rapidly on admission to hospital, and being due apparently to congestion of the inner ear. Wounds affecting the ear alone were uncommon and were nearly always accompanied by facial paralysis.

Seventy per cent. of all cases of typhus had ear complications—deafness, tinnitus, and intense hyperæmia of the naso-pharynx being the usual picture. Ten per cent. of these cases developed labyrinthine complications. In scurvy also, the percentage of ear lesions was high.

There were many cases of wounds of the frontal and maxillary sinuses. The procedure usually followed was open operation, and excision of the foreign body. Septal synechiæ were treated by the cautery and packing with boric vaseline gauze. The writer rarely saw wounds of the larynx. They nearly all died on the field. Also, the larynx was not often wounded, being protected by the chin, and being so movable. In the few cases he saw, the chief difficulty he encountered was in the treatment of cicatricial contractions, in the trachea and larynx.

In three patients who had been gassed the condition was a generalised œdema of the laryngeal mucous membrane. These cases cleared up under medical treatment. GAVIN YOUNG.

REVIEWS OF BOOKS

Diseases of the Ear, Nose, and Throat in Childhood. By DOUGLAS GUTHRIE, M.D., F.R.C.S.E. (A. & C. Black, Ltd., 1921.)

A useful little book in the well-known "Edinburgh Medical Series." It comprises upwards of eighty pages divided into three chapters, of which one is devoted respectively to ear, nose, and throat.

The illustrations, thirty in number, in the form of plain outline diagrams, are always clear and concise, and are in keeping with the objects for which the book has been written.

The author very rightly emphasises points of ætiology, and the fundamentals generally in the ear and throat diseases of childhood, and gives special attention to prevention, accurate recognition, and treatment.

Reviews of Books

Almost every paragraph has an important bearing on child welfare, and the manner in which the subject is presented, determined obviously by the personal experience of the author, renders the various points and their relative values at once intelligible, and should make the little volume a helpful guide, not only to nurses and social workers, but also to many whose aim is to treat these diseases in the course of general practice, and to increase their knowledge of these important and all too common afflictions of early childhood.

A number of useful prescriptions is given at the end of the book. There is a good index.

ARCHER RYLAND.

*Mathematische Theorie der Gehörs Empfindung.** By E. Budde.
1920. Berlin: Urban & Schwarzenberg.

Of this book, containing 195 pages, 160 are taken up by a mathematical treatise on wave motions. The remaining 35 are devoted to an exposition of the author's views on the mechanism of hearing, which are of some interest, and can be followed by the non-mathematical reader.

The writer gives a clear summary of what the cochlea does in the way of analysing sounds, and comes to the conclusion that it acts in every particular as a resonating organ, and that under no other hypothesis can the facts of sound analysis be accounted for. It is, however, impossible that resonant vibrations within the cochlea can be confined to single resonating elements. There is ample mathematical evidence to show that a periodic sound impulse within the cochlea has a whole series of diminishing values for basilar fibres on either side of the "maximum," and that these must also move. There must be a corrective mechanism in the ear which picks out the proper tone from the series of sense elements stimulated. "It is an obvious application of the principle of specific sense-energy that a stimulus extending over a series of sense cells is referred to the maximum point of the disturbance." The author relates a personal experience, which should be of considerable interest to psychologists, which tends to show that this "corrective mechanism" may be in abeyance in certain morbid states of the body.

Thus we arrive at the conception of "standing waves" forming along the length of the basilar membrane, the apices of the waves (*i.e.*, maximum points) corresponding to the pitches of the exciting tones. Diagrams are given to illustrate what happens when two standing waves overlap.

Now all this is familiar enough to the English student, for it was all set out with admirable lucidity by Dr A. A. Gray in the *Journal of Anatomy and Physiology*, 1900. Indeed, Budde does not develop

* The Book was received for review, 1st November 1921.

Reviews of Books

his thesis to anything like the full extent that Gray has done, for he does not give an explanation of the productions of noise as distinct from tone, nor does he give experimental illustrations of his application of the principle of specific sense-energy. Like most Continental writers, he is silent on the subject of the external spiral ligament, and yet the progressive increase in bulk of this structure from the apex to the base of the cochlea is one of the most striking features of the anatomy of the internal ear. The recognition of this fact and of its significance we also owe to Dr Gray.

Budde makes amends to some extent for the omission of the consideration of progressive variation in the tension of the basilar fibres, by devoting some pages to the discussion of the part played by the hitherto neglected factor of the inertia of the fluids of the cochlea. "When a stationary wave is established, the swinging takes place in such a way that the transport of energy goes on through a 'band' (or column) of fluid, from the oval window, through the maximum point of the deflection of the basilar membrane, to the round window and back. Each of these bands of fluid must have its own period of vibration." The idea of treating the column of fluid as a "load" on the basilar fibres has apparently not occurred to the author. The root conception is evidently the same as that put forward by the reviewer in November 1920,* and again in an article appearing in another part of the present number of the *Journal*, though the treatment of it is different. Budde apparently regards the progressively increasing mass of his "bands of fluid," together with the simultaneous increase in length of the basilar fibres from base to apex, as sufficient to account for the whole of the differentiation of the resonating elements over a range of 9-10 octaves. According to calculations made by the reviewer, of this differentiation the varying mass of the columns of fluid accounts for less than 3 octaves, variations of length of the basilar fibres for less than $1\frac{1}{2}$ octaves, and variations in tension for the remaining $4\frac{1}{2}$ to $5\frac{1}{2}$ octaves.

Two pieces of histological information which are new to the present writer appear on pages 187-8. (1) According to Wittmaack, the sense cells of Corti's organ are continued right through the reticular membrane into the tectorial membrane. The latter is adherent to Reissner's membrane. The "hairs" of the so-called hair-cells are artifacts. (2) "The Endolymph is a thick fluid similar in consistence to the Vitreous humour." No authority is quoted for the latter statement. If this be so, our views, not only of the movements taking place within the ductus cochlearis as the result of sound impulses, but also of the mechanism of vestibular reactions, will have to be modified.

G. WILKINSON.

* *Brit. Med. Journ.*, vol. ii., 1920, p. 859.

LETTER TO THE EDITORS

THE EDITORS,

The Journal of Laryngology and Otology.

DEAR SIRS,—Mr Mark Hovell contributes to your issue for October a plea for the partial removal of the tonsils, which calls for a reply from one of those who hold a different opinion. He bases his argument largely on the cases in which enlarged but healthy tonsils are present in children suffering from nasal obstruction due to adenoids, and states that such cases form the majority in children, that the enlargement is the result of the nasal obstruction, and that the tonsillar tissue contracts when free nasal respiration has been restored. If that be so, the logical treatment would be to remove the adenoids and to leave the tonsils to shrink untouched.

I do not find, however, that the majority of enlarged tonsils in children are healthy; on the contrary, in most cases the glands below the angle of the jaw can be felt to be slightly enlarged, showing some degree of septic absorption, and a large number suffer from attacks of tonsillitis. Numerous examinations of removed tonsils might be quoted in support of the above, and it has frequently been demonstrated that in chronic inflammation the deep part of the tonsil is involved as much as the superficial portion. I hold, therefore, that if removal of any part of the tonsil is indicated, then the entire gland should be removed. Mr Hovell makes light of the statement that the edges of the crypts sliced by tonsillotomy are apt to unite and cause retention of secretion; it is certainly a very common experience in my practice to see a severely septic condition in the remnants of tonsils left behind by a previous tonsillotomy.

One often sees a child with symptoms of nasal obstruction due to adenoids, whose tonsils are not enlarged, and who presents no tonsillar symptoms; in such cases it was formerly my practice to remove the adenoids and to leave the tonsils alone; but a considerable number of these children have been brought back to me two or three years later with symptoms of tonsillar inflammation and with enlarged tonsils, although the nasal obstruction has been completely removed, so that I now advise removal of even apparently healthy tonsils when the adenoids call for operation in children below the age of six or seven years. I do not think that the later tonsillar enlargement is due to neglect to remove the posterior ends of the inferior turbinals, for I have long been aware of Mr Hovell's recommendation, and I am prepared to remove the ends when they are enlarged.

I am not clear whether, by the term "enucleation," Mr Hovell refers only to the operation of dissection, or whether he includes

Letter to the Editors

complete removal with the guillotine. Complete removal with the guillotine does not produce any disabling cicatrisation, but I agree with him that the cicatrisation following the dissection operation may be a cause of disability, and I consider that this operation should be reserved for tonsils which cannot be removed entirely with the guillotine. The latter include very small septic tonsils, those fixed by adhesions, and those which have previously been partially removed.

Mr Hovell believes that hæmorrhage is more frequent and more severe after enucleation than after tonsillotomy. I, on the contrary, am convinced that it is less so after complete removal with the guillotine than after partial removal. On theoretical grounds, one would expect bleeding to be less free and persistent when the vessels are divided in the loose areolar tissue beneath the capsule of the tonsil than when they are severed in the firm substance of the tonsil itself, which is often also the seat of chronic inflammation and fibrosis. I have been operating on tonsils and adenoids at St George's Hospital for nearly eighteen years, the majority of the operations being performed in the out-patient department; the patients are seen after two or three hours, and, if there is any anxiety on the score of bleeding, they are admitted. I have no statistics, but my recollection is, that in the days of tonsillotomy, there were some two to four such admissions in each year; now that complete removal with the guillotine is practised, the admissions average less than one a year. The remaining portion of the tonsil frequently becomes swollen and inflamed after tonsillotomy, and I find that healing after complete removal is quicker and less painful, and that there is less liability to aural and other complications. Therefore, on the grounds of safety, of comparatively painless healing, and, above all, of freedom from subsequent tonsillar disease, I advocate complete removal with the guillotine whenever operation on the tonsils is indicated, and dissection only when the local condition makes enucleation with the guillotine impossible.—Yours faithfully,

HAROLD BARWELL, F.R.C.S.

GENERAL NOTES

ROYAL SOCIETY OF MEDICINE,

1 Wimpole Street, London, W. 1.

Section of Laryngology—President, Sir William Milligan, M.D.
Hon. Secretaries, W. G. Howarth, F.R.C.S., and T. B. Layton, D.S.O., M.S. The next Meeting of the Section will be held on 2nd December. Members intending to show cases or specimens are

General Notes

invited to send notice to the Senior Hon. Secretary, Mr W. G. Howarth, 75 Harley Street, London, W. 1.

Section of Otology—*President*, Dr A. Logan Turner. *Hon. Secretaries*, Norman Patterson, F.R.C.S., and F. J. Cleminson, M.Ch. The next Meeting of the Section will be held on 20th January 1922. Members proposing to show patients and specimens should send notice to the Senior Hon. Secretary, Mr Norman Patterson, 16 Devonshire Place, London, W. 1, at least twelve days before the meeting. Papers must be sent in at least twenty-one days in advance, complete and ready for printing.

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BRITISH MEDICAL ASSOCIATION.

Glasgow Meeting, 1922.

The Annual Meeting of the Association will be held in Glasgow from the 25th to 29th July.

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TENTH INTERNATIONAL CONGRESS OF OTOTOLOGY.

Paris, 1922.

President—Professor P. SÉBILEAU.

Treasurer—Dr GEORGES LAURENS.

Secretary-General—Dr A. HAUTANT, 28 rue Marbeuf, Paris (VIII.).

As already announced, the Meeting was originally fixed for the 26-30th July 1922. When it was pointed out that this would interfere with the Meeting of the British Medical Association in Glasgow, our French colleagues most courteously and at considerable inconvenience promptly arranged to alter the date. The Congress will be held in Paris from the 19th to 21st July, *i.e.*, the week preceding the Meeting of the British Medical Association.

Our Paris colleagues have further demonstrated their goodwill by a recent visit of the Secretary-General to London. Dr Hautant attended the Annual Dinner of the Section of Otology (Royal Society of Medicine) on the 21st October under the Chairmanship of Sir Charles Ballance, and took part in the Meeting of the Section the following afternoon, when the new President, Dr A. Logan Turner, occupied the Chair. British otologists were charmed with his personality and the warm invitation which he conveyed. There is little doubt that it will be cordially responded to.

The British Committee of Organisation has already received no less than 100 adherents. Those who may not have received a direct invitation are requested to communicate with the Secretaries, Mr. Lionel Colledge, 22 Queen Anne Street, London, W. 1., or Dr J. S. Fraser, 50 Melville Street, Edinburgh, sending their subscription of

General Notes

ten shillings. All who join the British Committee will be kept informed of details and arrangements for the Congress as they develop.

We are glad to hear that, although the Congress preserves the title of Otology, it will practically embrace both Rhinology and Laryngology. The mornings will be devoted to visits to operations, clinics and museums, and to the Institut Curie. As the Congress will be held in the Faculté de Médecin there will be every facility for demonstrating patients or specimens, and of giving exhibitions with the Lantern or Epidiascope. There will also be a Museum in connection with the Congress.

It was at first intended to have certain set subjects for general discussion. This plan has been altered. Representative otologists have been invited in different countries to choose their own subjects and to send in a *Rapport*, which will be printed in good time and circulated beforehand to every Congressionist who has sent his subscription to the Secretary-General. The Subscription to the Congress has been fixed at 100 francs (= £2).

As at present arranged, the following Rapporteurs have been nominated:—

Doctors Buys (Bruxelles) and Guix (Utrecht), "Vestibular Tests: their value as a functional measure of the vestibular route."

Professor Gradenigo (Naples), "Unsuspected Syphilis of the Ear."

Professor Schmiegelow (Copenhagen), "Diagnosis and Treatment of Abscess of the Cerebellum."

Mr G. Jenkins (London), "Otitic Meningitis."

Professor Hinojar (Madrid), Dr Reik (Boston), and Dr Segura (Buenos Ayres), have also been invited, but have not yet settled their subjects.

* * *

Professor M. HAJEK.

We are pleased to note that Dr M. Hajek, whom so many will recall at the old Policlinic in Vienna, has celebrated his sixtieth birthday. On the death of Chiari, he succeeded to the University Chair, and his pupils and friends have marked the present occasion by issuing in his honour a special number of the *Monatsschrift für Ohrenheilkunde und Laryngo-Rhinologie*.

* * *

The Editors of the Journal desire to express their indebtedness to Dr Douglas Guthrie and his staff of collaborators, and to thank them for the assistance which they have voluntarily given, throughout the year, in abstracting the current medical literature bearing upon the specialty.

General Notes

LIST OF ABSTRACTORS.

Brady, A. J., Sydney, Australia.	Lodge, W. Oliver, Halifax.
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Horgan, J. B., Cork.	Woodman, Musgrave, Birmingham.
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	Young, Gavin, Glasgow.

* * *

The Journal of Laryngology and Otology exchanges with the following periodicals:—

The Lancet.
 Medical Press and Circular.
 Proceedings of Royal Society of Medicine.
 St Bartholomew's Hospital Journal.
 The Glasgow Medical Journal.
 Archives of Radiology.
 The Medical Journal of Australia.
 The New York Medical Record.
 Journal of the American Medical Association.
 Journal of Ophthalmology, Otology, and Laryngology.
 Annals of Otology, Rhinology, and Laryngology.
 The Laryngoscope.
 Department of Literary Research, American College of Surgeons.
 Bulletin d'Oto-Rhino-Laryngologie.
 La Presse Médicale.
 L'Oto-Laryngologie Internationale.
 Revue de Laryngologie, d'Otologie, et de Rhinologie.
 Les Annales des Maladies d'Oreille, etc.
 Archives Internationales de Laryngologie, etc.
 Archivi Italiani di Laringologia.
 Archivio Italiano di Otologia.
 Acta Oto-Laryngologica.
 Münchener Med. Wochenschrift.
 Archiv. f. Ohrenheilkunde.
 Monatsschrift f. Ohrenheilkunde.
 Finder's Internationales Centralblatt für Laryngologie, etc.
 Zeitschrift. f. Laryngologie.
 Zentralb. f. Ohrenheilkunde und Rhino-Laryngologie.
 Zeitschrift f. Ohrenheilkunde.

INDEX

(*Crit. Rev.*)=Critical Review. (*Clin. Rec.*)=Clinical Record.

(*Ed.*)=Editorial

- Accessory Sinus Suppuration, Cranial Osteo-myelitis complicating (Neil Maclay) (*Clin. Rec.*), 478
- Adam, James*, Infection of the Middle Ear and External Auditory Meatus from Vincent's Organisms (*Clin. Rec.*), 186
- Anaphylaxis and Asthma (Charles M'Neil) (*Crit. Rev.*), 431
- Angeiomata of the Larynx (Irwin Moore), 11, 49
- Arthritis, Chronic, The Tonsil as a Focus of Infection in (W. M. Mollison) (*Crit. Rev.*), 188
- Asthma and Anaphylaxis (Charles M'Neil) (*Crit. Rev.*), 431
- Bronchoscopy in the Treatment of (W. S. Syme), 427
- Bárány, Professor R.*, Diagnosis of Disease of the Otolith Apparatus (translated by Dr A. R. Tweedie, Nottingham), 229
- Boyd, Gladys A. A.*, Report upon 188 Consecutive Cases of Acute Otitis Media and Mastoiditis in which the Schwartze Operation was performed, 217
- Bronchoscopy in the Treatment of Asthma (W. S. Syme), 427
- Bullet, Revolver, in Sigmoid Sinus (E. D. Dalziel Dickson) (*Clin. Rec.*), 575
- Burnham, Cecil*, see Patterson
- Campbell, Andrew*, A Conservative Treatment of Chronic Middle-Ear Suppuration, 121
- Cancer of the Larynx, Intrinsic: Usual Site of Origin, etc. (Sir St Clair Thomson), 462
- Cavernous Sinus Thrombosis (T. Ritchie Rodger), 169
- Chappell, Walter Franklin*, see Obituaries
- Chondroma of the Cricoid (E. B. Waggett, D.S.O.) (*Clin. Rec.*), 328
- Chorditis Fibrinosa (A. Brown Kelly), 5, 118
- Cleminson, F. J.*, Nasal Sinusitis in Children, 505
- Clinical Records, 27, 127, 177, 183, 186, 235, 237, 338, 343, 381, 526, 575
- Cochlea, Mechanism of, with Special Reference to Inertia of Contained Fluids (George Wilkinson), 557
- Colledge, Lionel*, Injuries to the Ear in Modern Warfare, 283
- Conservative Treatment of Chronic Middle-Ear Suppuration (Andrew Campbell), 121
- Cranial Osteo-myelitis complicating Accessory Sinus Suppuration (Neil Maclay) (*Clin. Rec.*), 478
- Cricoid, Chondroma of the (E. B. Waggett, D.S.O.) (*Clin. Rec.*), 328
- Critical Reviews, 29, 79, 188, 288, 384, 431, 529
- Deaf-Mutes, Vestibular Reactions in (Gavin Young), 524
- Deaf-Mutism (J. Kerr Love) (*Crit. Rev.*), 29
- Diagnosis of Disease of the Otolith Apparatus (Professor R. Bárány, translated by Dr A. R. Tweedie), 229

Index

- Diathermy in Inoperable Pharyngeal and Epi-Laryngeal Malignancy: its Objectives and Limitations, with a Review of Cases (Sir William Milligan), 369
- Dickie, J. K. Milne*, Experiences of an Otologist in France, 1915-19, 514
- Dickson, E. D.*, Revolver Bullet in Sigmoid Sinus (*Clin. Rec.*), 575
- Diggle, F. Holt*, and *F. B. Gilhespy*, A Review of Twenty Consecutive Cases of Acute Mastoiditis treated by B.I.P. and Primary Suture, 471
- Diphtheria "Carriers," the Rôle of the Tonsils in Certain Cases of (Herbert Tilley) (*Clin. Rec.*), 235
- Discarded Theories and Methods (P. M'Bride), 269
- Don, James*, and *H. R. Souper*, Encephalitis Lethargica, complicated by Double Chronic Suppurative Otitis Media (*Clin. Rec.*), 343
- Downie, James Walker*, see Obituaries
- Ear, Injuries to, in Modern Warfare (Lionel Colledge), 283
- Injuries to, in Modern Warfare (T. Jefferson Faulder), 277
- Suppuration, Chronic Middle, A Conservative Treatment of (Dr Andrew Campbell), 121
- Editorial (A. Logan Turner), 1
- The Education and Qualification of the Specialist (A. Logan Turner), 163
- Encephalitis Lethargica, complicated by Double Chronic Suppurative Otitis Media (James Don and H. R. Souper) (*Clin. Rec.*), 343
- Endoscopy, Peroral (Prof. Chevalier Jackson) (*Crit. Rev.*), 529
- Errata, 49
- Ethmoidal Cell Exploration, Posterior (Patrick Watson-Williams and Eric Watson-Williams), 464
- Problem, The (Ross Hall Skillern), 105
- Fatal Case of Shawl Pin in Œsophagus (W. Frank Wilson) (*Clin. Rec.*), 526
- Faulder, T. Jefferson*, Injuries to the Ear in Modern Warfare, 277
- Fibrinous Chorditis (A. Brown Kelly), 5, 118
- Foreign Body in the Œsophagus removed by External Œsophagotomy. Cure. J. N. Roy (*Clin. Rec.*), 183
- France, Experiences of an Otologist in, 1915-1919 (J. K. Milne Dickie), 514
- Freeman, Walter Jackson*, see Obituaries
- Frontal Sinus, Operations on (Walter G. Howarth), 417
- General Notes, 45, 104, 159, 215, 266, 319, 366, 415, 454, 503, 554, 598
- Gilhespy, F. B.*, see F. Holt Diggle
- Goldstein, Max A.*, The Value and Development of Residual Hearing (*Crit. Rev.*), 482
- Guillotine, Tonsil (Seymour Jones), 500
- Guthrie, Douglas*, "Latent" Thrombosis of the Lateral Sinus (*Clin. Rec.*), 127
- Gray, Albert A.*, Various Theories of Hearing (*Crit. Rev.*), 384
- Halle, Max*, Operative Treatment of Ozaena, Abridged Translation by J. B. Horgan, 567
- Harper, James*, Partial Thyroidectomy, 114
- Head-Nystagmus in Human Beings (S. H. Mygind), 72
- Health, Immunity in: The Function of the Sub-epithelial Lymphatic Glands (A. Logan Turner) (*Crit. Rev.*), 79
- Hearing, Residual, The Value and Development of (Max A. Goldstein) (*Crit. Rev.*), 482
- Various Theories of (Albert J. Gray) (*Crit. Rev.*), 384

Index

- Hobday, Frederick*, A Plastic Laryngeal Operation for Vocal Cord Paresis in the Horse, 422
- Horgan, J. B.*, Abridged Translation of Max Halle's Operative Treatment of Ozæna, 367
- Horse, A Plastic Laryngeal Operation for Vocal Cord Paresis in (Frederick Hobday), 422
- Hovell, T. Mark*, Is the Mere Enlargement of the Tonsil Good and Sufficient Reason for its Enucleation? 457
- Howarth, Walter G.*, Operations on the Frontal Sinus, 417
- Immunity in Health: the Function of the Subepithelial Lymphatic Glands (A. Logan Turner) (*Crit. Rev.*), 79
- Infection of the Middle Ear and External Auditory Meatus from Vincent's Organisms (Dr James Adam) (*Clin. Rec.*), 186
- Infection of the Middle Ear and External Auditory Meatus, with Vincent's Organisms (Wyatt Wingrave and Archer Ryland) (*Clin. Rec.*), 27
- Injuries to the Ear in Modern Warfare (Lionel Colledge), 283
- Injuries to the Ear in Modern Warfare (T. Jefferson Faulder), 277
- Inoperable Pharyngeal and Epi-Laryngeal Malignancy, Diathermy in: its Objectives and Limitations, with a Review of Cases (Sir William Milligan), 369
- Intra-Cranial Complication of Chronic Middle-Ear Suppuration (F. H. Wrigley) (*Clin. Rec.*), 381
- Jackson, Professor Chevalier*, Peroral Endoscopy (*Crit. Rev.*), 529
- Jones, Seymour*, Tonsil Guillotine, 500
- Kelly, A. Brown*, Chorditis Fibrinosa, 5, 118
- Killian, Professor Gustav*, see Obituaries
- Larynx, Angeiomata of (Irwin Moore), 11, 49
- Intrinsic Cancer of: Usual Site of Origin, etc. (Sir St Clair Thomson), 462
- "Latent" Thrombosis of the Lateral Sinus (Douglas Guthrie) (*Clin. Rec.*), 127
- Lateral Sinus, "Latent" Thrombosis of (Douglas Guthrie) (*Clin. Rec.*), 127
- Layton, T. B.*, Death after Tonsillectomy (*Clin. Rec.*), 177
- Lethargica, Encephalitis, complicated by Double Chronic Suppurative Otitis Media (James Don and H. R. Souper) (*Clin. Rec.*), 343
- Letters to the Editors, 365, 553, 597
- Lombard, Étienne*, see Obituaries
- Love, J. Kerr*, Deaf Mutism (*Crit. Rev.*), 29
- Lymphatic Glands, The Function of the Subepithelial: Immunity in Health (A. Logan Turner) (*Crit. Rev.*), 79
- M'Bride, P.*, Some Discarded Theories and Methods, 269
- M'Kenzie, Dan*, The Riddle of Olfaction (*Crit. Rev.*), 288
- Maclay, Neil*, Cranial Osteo-Myelitis complicating Accessory Sinus Suppuration (*Clin. Rec.*), 478
- M'Neil, Charles*, Asthma and Anaphylaxis (*Crit. Rev.*), 431
- Malignancy, Diathermy in Inoperable Pharyngeal and Epi-Laryngeal: its Objectives and Limitations, with a Review of Cases (Sir William Milligan), 369
- Malignant Tumour of the Mamma, Paralysis of the Vocal Cords secondary to (A. Logan Turner), 373
- Martin, G. Ewart*, see Patterson
- Mastoiditis, Acute, treated by B.I.P. and Primary Suture: A Review of Twenty Consecutive Cases (F. Holt Diggle and F. B. Gilhespy), 471

Index

- Mastoiditis in which the Schwartz Operation was performed, Report upon 188 Consecutive Cases of Acute Otitis Media and (Gladys A. A. Boyd), 217
- Mechanism of the Cochlea, with Special Reference to Inertia of the Contained Fluids (George Wilkinson), 357
- Middle Ear and External Auditory Meatus, Infection of, from Vincent's Organisms (Dr James Adam) (*Clin. Rec.*), 186
- Middle Ear and External Auditory Meatus, Infection of, with Vincent's Organisms (Wyatt Wingrave and Archer Ryland), (*Clin. Rec.*), 27
- Milligan, Sir William, Diathermy in Inoperable Pharyngeal and Epi-Laryngeal Malignancy: its Objectives and Limitations, with a Review of Cases, 369
- Mollison, W. M., The Tonsil as a Focus of Infection in Chronic Arthritis (*Crit. Rev.*), 188
- Moore, Irwin, Angeliomata of the Larynx, 11, 49
- Mygind, S. H., Vestibular Face Reflexes, 321
- Mygind, S. H., Head-Nystagmus in Human Beings, 72
- Nasal Sinusitis in Children (F. J. Cleminson), 505
- Nystagmus, Head, in Human Beings (S. H. Mygind), 72
- Obituaries—
Chappell, Walter Franklin, 318
Downie, James Walker, 501
Freeman, Walter Jackson, 318
Killian, Professor Gustav, 316
Lombard, Étienne, 47
Roaldes, Arthur Washington de, 318
Semon, Sir Felix, 211
Vérel, Raymond, 48
- Œsophagus, A Foreign Body in, removed by External Œsophagotomy: Cure (J. N. Roy) (*Clin. Rec.*), 183
- Fatal Case of Shawl Pin in (W. Frank Wilson) (*Clin. Rec.*), 526
- Olfaction, The Riddle of (Dan M'Kenzie) (*Crit. Rev.*), 288
- Operations on the Frontal Sinus (Walter G. Howarth), 417
- Operative Treatment of Ozæna (Max Halle), Abridged Translation by J. B. Horgan, 567
- Osteo-myelitis, Cranial, Complicating Accessory Sinus Suppuration (Neil Maclay) (*Clin. Rec.*), 478
- Otolith Apparatus, Diagnosis of Disease of (Professor R. Bárány, translated by Dr A. R. Tweedie, Nottingham), 229
- Otologist's Experiences in France, 1915-1919 (J. K. Milne Dickie), 514
- Ozæna, Operative Treatment of (Max Halle), Abridged Translation by J. B. Horgan, 567
- Paralysis of the Vocal Cords, Secondary to Malignant Tumour of the Mamma (A. Logan Turner), 373
- Paresis, Vocal Cord, in the Horse; a Plastic Operation for (Frederick Hobday), 422
- Patterson, Tyrrell, Cecil Burnham and G. Ewart Martin, Statistical Tables for the Years 1919 and 1920, from the Ear and Throat Department, Royal Infirmary, Edinburgh, 328
- Peroral Endoscopy (Prof. Chevalier Jackson) (*Crit. Rev.*), 529
- Pharyngeal and Epi-Laryngeal Malignancy, inoperable, Diathermy in; its Objectives and Limitations, with a Review of Cases (Sir William Milligan), 369
- Plastic Laryngeal Operation for Vocal Cord Paresis in the Horse (Frederick Hobday), 422

Index

- Report upon 188 Consecutive Cases of Acute Otitis Media and Mastoiditis in which the Schwartze Operation was performed (Gladys A. A. Boyd), 217
- Residual Hearing, The Value and Development of (Max A. Goldstein) (*Crit. Rev.*), 482
- Reviews of Books—
- Budde, E., *Mathematische Theorie der Gehörs Empfindung*, 595
- Buxton, Dudley Wilmot, *Anæsthetics: Their Uses and Administration*, 103
- Canuyt, G., and J. Rozier, with Preface by Professor Moure, *Local and Regional Anæsthesia in Oto-Rhino-Laryngology*, 210
- Cheatle, Arthur H., *Collection of Lantern Slides demonstrating the Surgical Anatomy of the Temporal Bone, with Photographs, Catalogue, and Guide*, 453
- Guthrie, Douglas, *Diseases of the Ear, Nose, and Throat in Childhood*, 594
- Hurst, Arthur E., *The Croonian Lectures on the Psychology of the Special Senses and their Disorders*, 158
- Imhofer, Dözent D. R., *Forensic Otology*, 103
- Kerrison, P. D., *Diseases of the Ear*, 264
- Leidler, Dr Rudolf, *Ohrenheilkunde: Für den Praktischen Arzt. von Priv. Doz.*, 209
- M'Kenzie, Dan, *Diseases of the Throat, Nose, and Ear*, 156
- Mann, Dr M., translated by A. R. Moodie, *Text-book of Tracheo-Bronchoscopy*, 263
- Martindale and Westcott, *The Extra Pharmacopœia*, 315
- Maynard, F. P., *Manual of Ophthalmic Practice: Manual of Ophthalmic Operations*, 414
- Medical Annual: A Year Book of Treatment and Practitioner's Index for 1921*, 550
- Reviews of Books—*continued*
- Parrel, G. de, *Medical Treatment in Oto-Rhino-Laryngology: Précis de Thérapeutique Médicale Oto-Rhino-Laryngologique*, 413
- Skillern, Ross Hall, *The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose*, 364
- Smith, Arthur E., *Block Anæsthesia and Allied Subjects, with Special Chapters on the Maxillary Sinus, Tonsils, and Neuralgias of the Nervus Trigemini*, 551
- Roaldes, Arthur Washington de, *see* Obituaries
- Rodger, T. Ritchie, *Cavernous Sinus Thrombosis*, 169
- Roy, J. N., *A Foreign Body in the Esophagus removed by External Esophagotomy: Cure* (*Clin. Rec.*), 183
- Ryland, Archer, *see* Wyatt Wingrave
- Schwartze Operation, Report upon 188 Consecutive Cases of Acute Otitis Media and Mastoiditis (Gladys A. A. Boyd), 217
- Semon, Sir Felix, 161
see Obituaries
- Sigmoid Sinus, Revolver Bullet in (E. D. Dalziel Dickson) (*Clin. Rec.*), 575
- Sinusitis, Nasal, in Children (F. J. Cleminson), 505
- Sinus Thrombosis, Cavernous (T. Ritchie Rodger), 169
- Skillern, Ross Hall, *The Ethmoidal Problem*, 105
- Souper, H. R., *see* Don
- Statistical Tables for the Years 1919 and 1920, from the Ear and Throat Department, Royal Infirmary, Edinburgh (Drs Tyrrell Patterson, Cecil Burnham, and G. Ewart Martin), 328
- Suppuration: A Conservative Treatment of Chronic Middle Ear (Andrew Campbell), 121

Index

- Suppuration : Chronic Middle Ear, An Intra-cranial Complication of (F. H. Wrigley) (*Clin. Rec.*), 381
- Syme, W. S., Bronchoscopy in the Treatment of Asthma, 427
- Theories and Methods, Some Discarded (P. M'Bride), 269
- Various, of Hearing (Albert A. Gray) (*Crit. Rev.*), 384
- Thomson, Sir St Clair, Intrinsic Cancer of the Larynx: Usual Site of Origin, as demonstrated at Fifty Laryngo-Fissures, and its Influence on Diagnosis, Prognosis, and Treatment, 462
- Thrombosis, Cavernous Sinus (T. Ritchie Rodger), 169
- "Latent," of the Lateral Sinus (Douglas Guthrie) (*Clin. Rec.*), 127
- Thyroidectomy, Partial (James Harper), 114
- Tilley, Herbert, The Rôle of the Tonsils in Certain Cases of Diphtheria "Carriers" (*Clin. Rec.*), 235
- Tonsil as a Focus of Infection in Chronic Arthritis (W. M. Molli-son) (*Crit. Rev.*), 188
- Enucleation, Is Mere Enlarge-ment Good and Sufficient Reason for? (T. Mark Hovell), 457
- Guillotine (Seymour Jones), 500
- Tonsillectomy, Death after (T. B. Layton) (*Clin. Rec.*), 177
- Tonsils, The Rôle of, in Certain Cases of Diphtheria "Carriers" (Her-bert Tilley) (*Clin. Rec.*), 235
- Traumatic Adhesion of the Soft Palate to the Posterior Pharyn-geal Wall following Removal of Tonsils and Adenoids : Re-estab-lishment of Nasal Respiration by Operation (A. Logan Turner) (*Clin. Rec.*), 237
- Turner, A. Logan, Editorial, 1
- Editorial: The Education and Qualification of the Specialist, 163
- Turner, A. Logan, Immunity in Health: The Function of the Sub-epithelial Lymphatic Glands (*Crit. Rev.*), 79
- Paralysis of the Vocal Cords, secondary to Malignant Tumour of the Mamma, 373
- Traumatic Adhesion of the Soft Palate to the Posterior Pharyn-geal Wall following Removal of Tonsils and Adenoids : Re-estab-lishment of Nasal Respiration by Operation (*Clin. Rec.*), 237
- Tweedie, A. R., Translation of Pro-fessor R. Bárány's "Diagnosis of Disease of the Otolith Apparatus," 229
- Ventricle Stripping Operation on Man (Michael Vlasto), 573
- Vérel, Raymond, *see* Obituaries
- Vestibular Face Reflexes (S. Mygind), 321
- Reactions in Deaf-Mutes (Gavin Young), 524
- Vincent's Organisms, Infection of the Middle Ear and External Auditory Meatus from (Dr James Adam) (*Clin. Rec.*), 186
- Infection of the Middle Ear and External Auditory Meatus with (Wyatt Wingrave and Archer Ryland) (*Clin. Rec.*), 27
- Vlasto, Michael, Ventricle Stripping Operation on Man, 573
- Vocal Cord Paresis in the Horse, A Plastic Laryngeal Operation for (Frederick Hobday), 422
- Cords, Paralysis of, secondary to Malignant Tumour of the Mamma (A. Logan Turner), 373
- Waggett, E. B., D.S.O., Chondroma of the Cricoid (*Clin. Rec.*), 328
- Warfare, Modern, Injuries to the Ear in (Lionel Colledge), 283
- Modern, Injuries to the Ear in (T. Jefferson Faulder), 277
- Watson-Williams, Eric, *see* Patrick Watson-Williams, 464

Index

- Watson-Williams, Patrick*, and *Eric Watson - Williams*, Posterior Ethmoidal Cell Exploration, 464
- Wilkinson, George*, Mechanism of the Cochlea, with Special Reference to Inertia of Contained Fluids, 557
- Wilson, W. Frank*, Fatal Case of Shawl Pin in the Oesophagus (*Clin. Rec.*), 526
- Wingrave, Wyatt*, and *Archer Ryland*, Infection of the Middle Ear and External Auditory Meatus, with Vincent's Organisms (*Clin. Rec.*), 27
- Wrigley, F. G.*, An Intra-Cranial Complication of Chronic Middle-Ear Suppuration (*Clin. Rec.*), 381
- Young, Gavin*, Vestibular Reactions in Deaf-Mutes, 524

ABSTRACTS

Ear:—

- Aviation, "Pointing" Test in Examination of Candidates for, 42
- Aviators, Acrobatic, Falling Reaction of, 150
- Labyrinthine Reactions of, 149
- Bone Conduction of Sound in Cetacea and its Relation to Increased Bone Conduction in Human Beings, 44
- Brain Abscess, Experimental Observations of Treatment of, 259
- Position of Patient after Operation on, 258
- Surgical Treatment of, 257, 258
- Caloric Test in the New-born, 358
- Cerebellar Abscess, 256
- Cerebral Abscess complicating Mastoid Disease with Cholesteatoma, 151
- Conservative Radical Operation, My Method of (Bárány), 585
- Deaf, Teaching of the, 43
- Deaf-mutism, Traumatic, Histology of, 358
- Eustachian Obstruction, Radium Treatment in, 152
- Tube and its Associated Muscles, 142
- Impaired Hearing, The Psychic Factor in, 587
- Labyrinthine Complications in Middle-Ear Suppuration, 148
- Lobe of Ear, Oriental Sore of, 445

Ear—continued

- Mastoid Operation, Incomplete, as a Cause of Delayed Healing, 145
- Process, Comparative Anatomy of, 358
- Suppuration, Right, Causing Left-sided Facial Paralysis, 145
- Mastoidectomy (Peri-sinus Abscess, Exposure of Dura) followed by Toxic Insanity: Recovery, 446
- Mastoiditis and Suboccipital Pott's Disease, 40
- Latent, 445
- Meningitis and Brain Abscess Secondary to Fractured Skull, 39
- Symptomless Influenzal, 151
- The Chances of Cure of, by Tentative Tonsillo-Adenectomy, 360
- Mastoidotomy, Preventative, 39
- Middle Ear, Does Removal of Adenoid Vegetations Prevent Acute Disease of? 540
- Organisation of Inflammatory Exudates in, 541
- Nervus Acousticus, Bárány Tests in Tumours of, 146
- Nystagmus (after), Decrease of, during Repeated Rotation, 41
- Tests, Reliability of, 40
- Oculo-Cardiac Reflex in Oto-Rhinolaryngology, 540
- Otitis Media, Acute Purulent, in Children, 585
- Cure of Chronic Purulent, 360

Index

Ear—*continued*

- Otology, Popular Fallacies in Practice of, 361
- Otorrhœa, Chronic, Treatment of, by Zinc Ionisation, 151
- in Tuberculous Subjects, 446
- Secondary, 446
- Paralysis, Facial, as an Indication for Mastoid Operation in Acute Middle-Ear Suppuration, 359
- Retro-auricular Drainage, 586
- Rotatory and Caloric Tests in Pigeons, Experimental Studies on, 588
- Syphilis, Hereditary, Observations on Deafness from, 361
- Temporo-Sphenoidal Abscess, 259
- Tensor Veli Palati and Levator Veli Palati Muscles, Innervation of, 253
- Thrombosis, Cranial Sinus, in Children, 255
- Lateral Sinus, 254
- Primary, of the Superior Petrosal Sinus, 448
- Septic, of the Sigmoid Sinus without Pyæmic Fever, 449
- Tympanic Suppuration, Invasion of Internal Ear by, 357
- Tympanum, Rupture of, from Shell Explosion, 447
- Vertigo, 359
- Vestibular, of Non-Suppurative Origin, 149
- Miscellaneous :—
- Acitynomycosis, Pharyngo-Laryngeal, 499
- Anæsthetics, Intracardiac Injection of Adrenalin during Administration of, 547
- Local, in Nose and Throat Work : Report of Committee on, 155
- Asthma and Anaphylaxis, 313
- Aviation Candidates, Incidence of Nose, Throat, and Ear Disease among, 155
- Campaign 1916-1918, Observations during, 593
- Cleft Palate Speech, 154

Miscellaneous—*continued*

- Face, Plastic Operation on, by Means of Fat Grafts, 453
- Jugular Vein, Thrombosis of, and Deep Cervical Abscess, 152
- Œsophagus, Sloughing of, due to Hydrochloric Acid Poisoning, 154
- Paralysis, Complete, Bilateral, Spastic, of Face, Jaw, Tongue, and Larynx, 154
- Rhinoplasty, Cosmetic, Use of Paraffin in, 499
- Sigmoid Sinus and Jugular Bulb, Paralysis of Cranial Nerves due to Aneurysmal Dilatation of, 411
- Thyro-glossal Tract, Surgical Treatment of Cysts of, 313
- Trigeminal Neuralgia, a Refinement in Radical Operation for, 409
- Deep Alcohol Injections in Treatment of, 410
- Tubercle, Bone and Joint, Stigmata of Predisposition to, 412
- Tuberculosis of Mouth, Pharynx, Larynx, and Nose, Light Treatment in, 453
- Pulmonary, Roentgenological Determination of, 153
- Tumour, Amyloid, in Palate and Nasal Cavity, 314
- Vermis Cerebelli, Function of, in Rabbits, 548
- Nose and Accessory Sinuses :—
- Accessory Sinus Disease causing Loss of Vision, 205
- Angiomatosis, Diffuse, of Nose and Skin, 307
- Antrum and Upper Jaw, Malignant Growths of, 203
- Malignant Tumours of, 202
- Maxillary, Drainage of, 310
- Brain, Abscess in Acute Infection of Nasal Accessory Sinuses, 97
- Cerebral Abscess of Frontal Sinus Origin, 97
- Cysts of Floor of Nose, 402
- Deformities, New Intranasal Procedures for Correction of, 201

Index

Nose and Accessory Sinuses—*contd.*
 Ethmoiditis, Posterior; Exophthalmos and Third Nerve Palsy due to, 207
 Frontal Sinus Operation, Radical, Technique of, 495
 — Sinusitis, Case of Extra-dural and Sub-dural Abscess following, 591
 Glioma of Nose, 201
 Hay-fever, Causes and Treatment of, 308
 Nasal Sinus Disease in Infants and Young Children, 96
 — Sinuses, Post-operative Obliteration of, 403
 — Tampons, Influence of, on Bacterial Flora of Nose, 307
 — Vestibule and Auditory Meatus, Staphylococcal Infections of, 202
 — Vestibule, Sarcoma of, 402
 Optic Nerve Disturbances in Disease of Posterior Nasal Sinuses, 204
 — Neuritis Associated with Disease of Nasal Sinuses, 203
 Ozæna, Critical Review of the Operative Treatment of, 567
 — Etiological Study of, 308
 — Italian Contributions to Study of, 494
 Pansinusitis, Ethmoidal Operations for, 206
 Pneumo-Sinus Frontalis Dilatans, 96
 Sinusitis, Treatment of Acute Nasal, 310
 Tear Passages, X-ray Examination of, 306
 Turbinated, Middle, in Acute Inflammation in Sinuses, 309
 Larynx :—
 Bronchitis due to Empyema of the Maxillary Antrum, 98
 Laryngeal Tuberculosis, Advanced, Possibilities of Curing, 311
 — Tuberculosis, Treatment of, especially with X-rays, 311
 — Tuberculosis, Treatment of by General Carbon Arc-light Baths, 312

Larynx—*continued*
 Laryngeal Function in Thyroid Cases, 403
 — (Edema caused by Cellulitis of Parapharyngeal Tissues, 406
 Laryngitis, Ulcero-Membranous, 363
 Laryngo-fissure for Carcinoma, 405
 Larynx, Chondroma of, 412
 — Complete Extirpation of, in Carcinoma, 98
 Thyroid Cartilage and Cricoid Cartilage, Radiological Observations on, 406
 Pharynx and Naso-pharynx :—
 Adenoids, Removal of, in Infancy, 362
 Bacteria found in Throats of Healthy People, Significance of, 545
 Bacterial Flora of Upper Air Passages during Common Colds, 545
 Diphtheria and other Exudations in the Throat, Clinical Diagnosis of, 99
 — Carriers, Tonsillectomy as a Means of Treatment in, 100
 — Carriers, Treatment of, with Klebs-Löffler Vaccine, 99
 — Convalescents, Problem of the "Positive Throat," 100
 — Diagnosis and Treatment of, 546
 — Prophylactic Immunisation with Toxin-Antitoxin Mixture, and the Schick Reaction, 546
 Friedländer's Bacillus, Mechanism of Carrier State with Special Reference to, 545
 Naso-pharynx, Foreign Body (Chewing Gum) in, 362
 Tonsil and Adenoid Removal and Vaccines as Treatment of Alopecia Areata of the Scalp, 362
 — Enucleation of Upper Pole, 543
 — Local Anæsthesia for Enucleation of, 543
 — Primary Actinomycosis of, 207

Index

Pharynx and Naso-pharynx—*contd.*

Tonsils, Multiple Bone Formation in, 363

Tonsillectomy, Effect of on Recurrence of Acute Rheumatic Fever and Chorea, 260

— under Local Anæsthesia, 261

— versus Vaccine Therapy in Systemic Disease of Tonsillar Origin, 542

Tonsillitis, Renal Complications of Acute Lacunar, 208

Tumours, Mixed, of Throat, Mouth, and Face, 259

Vincent's Angina Infection, 544

Peroral Endoscopy :—

Bronchi, Foreign Bodies in, 496

— Physical Signs of Foreign Bodies in, 261

Bronchitis, Arachidic, 100

Bronchoscope, Direct Treatment of Pulmonary Suppuration through, 449

— Röntgenographic Studies of Bronchiectasis, etc., through the, 450

Bronchoscopy, Œsophagoscopy and Gastroscopy, Fleuroscopic, 498

Bronchus, Foreign Bodies of Dental Origin in, Pulmonary Complication, 101

Peroral Endoscopy—*continued*

Bronchus, Foreign Body in Left Upper Lobe, 497

Foreign Bodies in Pre-endoscopic Days, 102

Intra-Bronchial Injections, Treatment of Gangrene of Lung by, 592

Larynx and Trachea, Cicatricial Web Stenosis of, 409

Mouth Operations, Protection of Throat during, 101

Œsophageal Cancer, Functional Signs of, 496

— Obstruction in Young Children, 262

— Obstruction in Girl aged 4½ years, 408

Œsophagoscope, Gunshot Wound in which Bullet was removed by means of, 408

Œsophagotomy, External, for Extraction of Denture from Thoracic Œsophagus, 497

Œsophagus, Congenital Stenosis of, 592

— Diverticula of, 451

— Foreign Body in, for 9 months, 591

— Treatment of Severe Cicatricial Stenosis of, 451

Trachea, Foreign Body (Coin) in, 408

— Syphilitic Stricture of, 102

SOCIETIES' PROCEEDINGS

Sections of Anæsthetics and Laryngology :—

Anæsthesia in Throat and Nose Operations, Discussion on, 239

Section of Laryngology :—

Acromegaly, Case of (Eleanor Lowry), 539

Adenoids and Enlarged Tonsils in Young Children, Some Suggested Alternatives to Operation for (James Donelan), 138

Antrum and Ethmoid, Sarcoma of (Arthur Hutchison), 539

Section of Laryngology—*continued*

Antrum and Orbit, Right, Carcinoma of (Norman Patterson), 197

— of Highmore, Chronic Suppuration of, treated by the Canfield Operation (Sir J. Dundas-Grant), 436

Aphonia, Prolonged and Obstinate Functional (Dan M'Kenzie), 197

Aryepiglottic Fold, Fibroma of, removed with the Aid of Suspension Laryngoscopy (W. M. Mollison), 198

Index

Section of Laryngology—*continued*

- Arytæmoid, Streptococcal Ulcer on,
Case of (W. M. Mollison), 299
- Arytenoids, Fixation of, in Osteo-
arthritis (A. J. Hutchison), 397
- Asthma, Bronchoscopy in the Treat-
ment of (W. S. Syme), 427, 584
- Bronchus, Left, New Growth in
(Sir J. Dundas-Grant), 436
- Tooth removed from, by
Peroral Endoscopy (Frank A.
Rose), 300
- Cheek, Large Fibrous Tumour of
(W. Lloyd and Wm. Hill), 396
- Choana, Left, Congenital Occlusion
of (J. Dundas Grant), 200
- Choanæ, Polypi in, in Children
(Douglas Guthrie), 38
- Dacryocystotomy, Per Nasal (Law-
son Whale), 348
- Dental Cyst, Large (G. W. Davies),
492
- Dysphagia, A Clinical Type of
(D. R. Paterson), 139
- Epiglottis, Epithelioma of, treated
by Diathermy (R. A. Worthing-
ton), 38
- Epilaryngeal Growths, Large,
Lateral Pharyngotomy for (Wil-
fred Trotter), 347
- Food and Air Passages, Some
Practical Points in Removal
of Foreign Bodies from (Fifty-
one Cases) (Sir Wm. Milligan),
348
- Forehead, Suppurating Dermoid
Cyst of (Herbert Tilley), 197
- Frænum Linguae, Case of Long
(Irwin Moore), 37
- Frontal and Ethmoidal Suppuration
complicating Scarlet Fever, Two
Cases of (T. B. Layton and J. F.
O'Malley), 537
- Frontal Bone, Sarcoma (?) of (G. W.
Dawson), 493
- Perithelioma (Alveolar Sar-
coma) of (H. Lawson Whale), 241
- Frontal Sinus, Left, Chronic Super-
ficial Abscess of (Archer Ryland),
396

Section of Laryngology—*continued*

- Frontal Sinus, Left, with Acute
Suppuration; Radical (Killian)
Operation (Irwin Moore), 301
- Operations on (W. G. Howarth),
417; Discussion on, 579
- Right, Radiograms showing
Absence of (A. J. Hutchison), 135
- Suppuration, Latent Double
(W. M. Mollison), 198
- Suppuration: Extradural Ab-
scess (Norman Patterson), 298
- Frontal Sinuses, Bilateral Chronic
Empyemata of (Herbert Tilley),
297
- Sinusitis, A Case of (T. B.
Layton), 300
- Goitre, Exophthalmic, Bilateral
Abductor Paralysis in (T. B.
Layton), 537
- Exophthalmic; Removed by
Thyroidectomy (C. Firwin Cuth-
bert), 241
- Hoarseness in a Man, aged 36
(W. H. Kelson), 346
- Horse, Plastic Laryngeal Operation
for Vocal Cord Paresis in (Pro-
fessor F. Hobday), 422, 583
- Intra-tracheal Tumour removed by
Peroral Tracheoscopy (Herbert
Tilley), 197
- Jaw, Upper, Dentigerous Cyst of
(Follicular Odontome) (Douglas
Guthrie), 396
- Upper, Malignant Disease of;
Lateral Rhinotomy (C. W. M.
Hope), 242
- Larynx, Angioma of (Irwin Moore),
348
- Cancer of, Impaired Mobility
of Cord in (Sir St Clair Thomson),
348
- Carcinoma (?) of the (Somer-
ville Hastings), 395
- Cavernous Angioma of
(Norman Patterson and N. H.
Pike), 347
- Cyst of (Jobson Horne), 197
- Cyst of (Norman Patter-
son), 197

Index

Section of Laryngology—*continued*

- Larynx, Cystomata of the (W. Jobson Horne), 435
- etc., Extensive Lupus of (E. D. D. Davis), 195
- Extrinsic Cancer of (Wilfred Trotter and Sir St Clair Thomson), 347
- Healed Tuberculosis of, with Fixation of Vocal Cord following (Sir J. Dundas-Grant), 436
- Intrinsic Cancer of (Sir St Clair Thomson), 462, 538, 580
- —, after Laryngo-fissure (Five Cases), Sir St Clair Thomson), 347
- — (G. A. Carter, C. W. M. Hope, Sir St Clair Thomson), 200
- Mutton Bone impacted in (Douglas Guthrie), 199
- Edema of Upper Aperture of (Sir James Dundas-Grant), 397
- Papilloma of, with a Malignant Tendency (H. Buckland Jones), 243
- Papillomata of (G. W. Dawson), 538
- Simple Tumours of, Three Cases (J. Dundas Grant, A. L. Macleod, and G. W. Dawson), 38
- Supraglottic Tumour of (A. L. Macleod), 346
- Tumour of; A Soft Fibroma (W. H. Jewell), 399
- Laryngeal Case for Diagnosis (Andrew Wylie), 242
- Growth (?) with Abductor Paralysis (Eleanor Lowry, M.B.), 400
- (?) Tuberculosis (Lionel Colledge), 301
- Tuberculosis, Spontaneous Cicatrization of (Sir St Clair Thomson), 200
- Tuberculosis treated with the Galvano-Cautery (Sir St Clair Thomson), 538
- Ventricle and Ventricular Bands, Tumours of the (W. Jobson Horne), 397

Section of Laryngology—*continued*

- Laryngeal Web, Congenital (R. A. Worthington), 396
- Laryngectomy, Total (Sir Charters Symonds), 347
- Laryngis, Sacculus, Eversion of the (Irwin Moore), 398
- Laryngitis, Tuberculous (T. B. Layton), 196
- Laryngocele (Frederick Spicer), 396
- Laryngo-stroboscope (E. W. Scripture), 297
- Leontiasis Ossium (Lambert Lack), 359
- Lingual Cancer treated with Copper Alanine (James Donelan), 242
- Lupus treated by Sodium Iodide and Ionisation (Douglas Harmer and T. H. Just), 396
- Maxilla, Chronic Osteomyelitis of, of Dental Origin (G. W. Dawson), 195
- Superior, Actinomycosis of, (Douglas Harmer and T. H. Just), 396
- Maxillary Antral Disease, Series of Cases of (W. S. Syme), 141
- Mediastinal Abscess, Fatal (William Hill), 199
- Microscopic Specimens (Wyatt Wingrave), 141
- Mouth and Submaxillary Region, Painless Swelling of, probably Actinomycosis (W. H. Jewell), 196
- Fauces and Epiglottis, Pemphigus of (Sir J. Dundas-Grant), 347
- Nares and Nasopharynx, Adenofibro-myxoma of, removed by Lateral Rhinotomy (C. Firwin Cuthbert), 241
- Nares, Sarcoma of (Herbert Tilley), 346
- Nasal Accessory Sinuses, Gunshot Wounds of (J. F. O'Malley), 140
- Cavity, Extensive Malignant Endothelioma of (Dan M'Kenzie), 539

Index

Section of Laryngology—*continued*

- Nasal Cavities and Nasal Accessory Sinuses, Cases, Casts, Photographs and Diagrams illustrating repair of Wounds of (G. Seccombe Hett), 37
- Deformities treated by Transplantation of Costal Cartilage (Douglas Guthrie), 346
- Septum, Dental Abscess of (Dan M'Kenzie), 300
- Septum, Fibroma of (Dan M'Kenzie), 300
- Large Angeioma of (Herbert Tilley), 399
- Naso-pharyngeal Angeio-Fibroma (G. W. Dawson), 136, 200
- Naso-pharynx, Dense Growth in, simulating Adenoids (J. Dundas Grant), 299
- Gumma in Vault of (J. Dundas Grant), 299
- Sarcoma and Endothelioma of, Treatment by Radium (Douglas Harmer and N. S. Finzi), 298
- Nose, Cyst of Floor of (G. W. Dawson), 242
- Cyst of Floor of (J. F. O'Malley), 299
- Depressed Bridge of, Baby with (W. Douglas Harmer), 301
- Dermoid Fistula of (W. Stuart-Low), 37
- External, Tumour of; Adenoma of Lachrymal Duct (H. L. Whale), 346
- Foreign Body (Centipede) discharged from (Cyril Horsford), 400
- Foreign Body removed from, after Thirteen Years (R. A. Worthington), 38
- Melanotic Sarcoma of (W. M. Mollison), 200
- Nostril and Nasal Cavity, Supernumerary, on Right Side (H. Bell Tawse), 200
- Nostrils, Bilateral Retention Cysts of Floor of (G. W. Dawson), 492

Section of Laryngology—*continued*

- Oesophagus, Application of Radium in Malignant Disease of (William Hill), 141
- Congenital Deformity of (W. Appleyard), 346
- Multiple Polypi (Oedematous Fibromata) of Middle Third of (William Hill), 199
- Obstruction of the, by a Foreign Body acting as Ball Valve (Somerville Hastings), 435
- Removal by the Indirect Method of a Jagged Piece of Bone impacted in (W. Jobson Horne), 135
- Spasm at the Entrance to the (A. Brown Kelly), 139
- Ozæna, Treatment of, by Ionic Medication (A. J. Hutchison), 141
- Palate and Pharynx, Large Submucous Lipoma of (Herbert Tilley), 196
- Hard, Extensive Papilloma of (W. J. C. Nourse and Archer Ryland), 200
- Lupus of (W. M. Mollison), 298
- Soft, Operation for Complete Removal of (Dan M'Kenzie), 139
- Paralysis, Bilateral Abductor (Dan M'Kenzie), 397
- Bilateral, of the Internal Tensors of the Larynx (Philip Franklin), 437
- Bilateral Adductor (Philip Franklin), 400
- of Right Recurrent Laryngeal Nerve after Thyroidectomy (T. B. Layton), 397
- Paralysis, Right-sided, Recurrent, with Partial Atrophy of Tongue (W. G. Howarth), 395
- Paresis, Glosso-palato-vagal, Case of (W. M. Mollison), 437
- Pharyngeal Diverticula (Horace Law), 241

Index

Section of Laryngology—*continued*

- Pharyngeal Diverticula (W. H. Kelson), 140
 — and Epi-Laryngeal Malignancy, Inoperable, Diathermy in (Sir Wm. Milligan), 369, 581
 — Pouch (Archer Ryland), 492
 — Pouch (W. H. Kelson), 437, 538
 — Pouch, Two Cases of (William Hill and J. Dundas Grant), 38
 Pharynx, Deep, Multiple Polypi of the (William Hill), 395
 — Epithelioma of, successfully treated by Diathermy (Norman Patterson), 195
 — Scarlatinal Scarring of (Dan M'Kenzie), 492
 Pituitary Tumour removed by the Nasal Route (H. Lawson Whale), 135
 — Tumour treated by Sellar Decompression (H. L. Whale), 194
 — Tumours, Sellar Decompression for (Walter Howarth), 141
 Post-cricoid Area, Statistics bearing upon the Sex and Age Incidence of Carcinoma of (A. Logan Turner), 198
 — Region and Upper End of (Esophagus, Carcinoma of (A. Logan Turner), 348
 Post-nasal Space, Lympho-sarcoma of (C. W. M. Hope), 395
 Proboscis, Lateral, Case of (Philip Franklin), 492
 Pylorus, Fork Accidentally Swallowed and Impacted in (W. Hill and K. A. Lees), 37
 Rhinitis, Atrophic, Intranasal Dacryocystotomy as a Help in (H. A. Kisch), 346
 — Atrophic, with Ozæna, Method of Treating (T. H. C. Benairs and C. H. Hayton), 136, 138
 — Gaseous (Dan M'Kenzie), 299
 Rhinoplasty, Casts and Models Illustrating (H. D. Gillies and G. Seccombe Hett), 141

Section of Laryngology—*continued*

- Sinusitis, Latent, in Children (P. Watson-Williams), 348
 — Latent, in Relation to Systemic Infections (P. Watson-Williams), 138
 Sinusitis, Multiple, with Necrosis of Frontal Septum (James Donelan), 298
 Spheno-Choanal Polypus, Recurring, in a Child (Irwin Moore), 37
 Sphenoidal Sinus Empyema and Cerebro-spinal Meningitis (D. Embleton and E. A. Peters), 140
 Supraglottic Tumour which proved to be a Cavernous Angioma (Norman Patterson and Norman Pike), 300
 Throat, Larynx and Maxillary Sinus, Cases of Malignant Disease of (A. Wylie, W. Stuart-Low, W. S. Syme, and Gay French), 37
 Thyro-fissure, Hæmorrhage in, and the Chief Vessel concerned (Irwin Moore), 297
 Thyro-glossal Cyst (W. H. Jewell), 539
 Thyroid, Lingual, Case of (George Badgerow), 437
 — Simple Enlargement of, with Bilateral Abductor Paresis of Cords (C. F. Beevor), 437
 Tongue Case for Diagnosis (Douglas Harmer), 196
 — Epithelioma of, treated by Amino-propionate of Copper (James Donelan), 198
 — and Larynx, Lupus of (T. B. Layton), 242
 — Tumour of Base of (G. W. Dawson), 195
 — and Posterior Pharyngeal Wall, Adhesions between (Norman Patterson), 399
 Tonsil, Actinomycosis? of (Coubro Potter and Marrian Perry), 242
 — Enucleation, Is mere Enlargement Good and Sufficient Reason for? (T. Mark Hovell), 457, 577

Index

Section of Laryngology—*continued*

- Tonsil, Giant Cell Systems in a (W. M. Mollison), 395
- Left, after removal of Epithelioma by Diathermy (Frank Rose), 135
- Sarcoma of (G. W. Dawson), 194
- Sarcoma of (W. M. Mollison), 195
- Tonsillectomy, Fatal, Two Cases of (A. L. Macleod), 399
- for Rheumatoid Arthritis (W. M. Mollison), 348
- Tonsils, Complete Enucleation of (Irwin Moore), 194
- Enlarged Diseased, of Cryptic Type, destroyed by Applications of Escharotic Paste (London Paste) (Irwin Moore), 199
- Treatment of Enlarged or Diseased, in Cases where Surgical Procedures were contra-indicated (Irwin Moore), 140
- Trachea, Atrophic Catarrh of (Lionel Colledge), 242
- Papilloma at Bifurcation of (W. Jobson Horne), 200
- Vocal Cord, Cyst on (W. M. Mollison), 395
- Left, Paralysis of (James Donelan), 194
- Pachydermia of (E. D. D. Davis), 538
- Vocal Cords, Bilateral Adductor Paresis of (Michael Vlasto), 493
- Fibroma of, Five Cases (J. Dundas Grant), 299
- Paralysis of, secondary to Malignant Tumour of the Mamma (A. Logan Turner), 373, 582
- Voice, Case of Delayed Breaking of, in a Youth of 18 (Jobson Horne), 196
- Sections of Laryngology and Ophthalmology :—
- Orbit and Accessory Sinuses, Injuries and Inflammatory Diseases affecting the, Discussion on, 136

Section of Otology :—

- “Attic” Suppuration, Chronic, with few Symptoms but Extensive Suppuration in Mastoid Antrum and Cells (Herbert Tilley), 304
- Auditory Canal, External, Tumours of (Sydney Scott), 303
- Attic Syringe, A Useful (J. Dundas Grant), 246
- Auricle, Epithelioma of (Norman Patterson), 439
- Left, after Operation for Epithelioma (W. Stuart-Low), 95
- Cerebellar Abscess complicated by Thrombosis of the Lateral and Cavernous Sinuses (E. D. D. Davis), 249
- Cerebro-spinal Fever, Labyrinth Infection in (Archer Ryland), 438
- Deaf-Mutism, Hysterical, of Eighteen Years’ Duration (A. F. Hurst and W. M. Mollison), 244
- Degeneration, Stigmata of, associated with Deafness (Hugh E. Jones), 34
- Ear, Aspergillus from (Arthur Cheatle and W. d’Este Emery), 250
- Gunshot Wound of (Harold A. Kisch), 401
- Injuries to, in Modern Warfare (Jefferson Faulder and Lionel Colledge), 439
- Sarcoma of Left Middle, arising in Eustachian Tube (Richard Lake), 249.
- Ears, Pyorrhœa Alveolaris affecting the (Arthur J. Hutchison), 401
- External Rectus Paralysis (A. J. Hutchison), 438
- Hearing, Demonstration on a New Theory of (Sir T. Wrightson and Prof. A. Keith), 86
- Labyrinth - Sinus or Pressure Nystagmus Symptoms (Sydney Scott), 303
- Traumatic Destruction of, illustrating the “Marking Time” Test (J. Dundas Grant), 245

Index

Section of Otology—*continued*

- Labyrinthectomy (J. F. O'Malley), 129
- Labyrinthitis, Circumscribed (J. F. O'Malley), 129
- Diffuse Purulent Meningitis
- Labyrinthectomy: Cure (P. Watson-Williams), 302
- Lepto - Meningitis, Streptococcal (Sydney Scott), 356
- Mastoid Antrum, Foreign Body in (Jefferson Faulder), 401
- Mastoid Operations, Radical and Modified Radical (J. S. Fraser and W. T. Garretson), 35
- Mastoidectomy, Septic Infection of the Lateral Sinus accidentally injured during Operation of (Hunter Tod), 36
- Mastoiditis, Acute, from Chronic Maxillary Empyema (Herbert Tilley), 349
- Bezold's (J. F. O'Malley), 306
- Paralysis of Eye Muscles in Connection with; Recovery (W. M. Mollison), 438
- Meatus, External, Atresia of (H. Bedford Russell), 354
- External Auditory, Congenital Cupping of, with Keratosis (Richard Lake), 301
- External, Congenital Redundant (Dan M'Kenzie), 243
- Meatus, Stenosis of, following Otitis Media (E. D. D. Davis), 249
- Menière's Syndrome (Lionel Colledge), 302
- Meningitis, Purulent Otitic (J. F. O'Malley), 301
- Middle-Ear Suppuration, Chronic, Healing after (Lionel Colledge), 306
- Nerve, Eighth, Tumours of the (J. S. Fraser), 349
- Neuro-Labyrinthitis, Meningitic (J. S. Fraser and J. K. Milne Dickie), 247
- Ossiculectomy (J. Dundas Grant), 245

Section of Otology—*continued*

- Ossiculectomy in Chronic Adhesive Process (P. Watson-Williams), 129
- Otitis Media, Chronic Catarrhal (Sir Wm. Milligan), 354
- Meningitis and Death following Fracture of the Base (J. S. Fraser), 130
- Otorrhœa, Chronic, Zinc Ionization and Electrolysis in the Treatment of (A. R. Friel), 437
- Otosclerosis associated with Fragilitas Ossium and Blue Sclerotics (J. S. Fraser), 133
- associated with Otitis Media (J. S. Fraser), 132
- Paralysis, Complete Vestibular, with Partial Auditory, caused by Blow on Mastoid Process (T. B. Layton), 306
- Facial (J. Dundas Grant), 306
- Facial, with Nerve Deafness and Impaired Vestibular Reactions (Dan M'Kenzie), 303
- Facial, Transplantation of Anterior Half of Masseter Muscle for (Somerville Hastings), 249
- Traumatic Facial, produced in an Unusual Way (H. J. Banks-Davis), 245
- Sinus Thrombosis, Cavernous (T. Ritchie Rodger), 400
- Lateral, without Otorrhœa (W. M. Mollison), 440
- Sinusitis in Children, Discussion on (F. J. Cleminson), 536
- Stapes, Malformation of (Professor S. G. Shattock and S. R. Tattersall), 243
- Teaching of Otology, Rhinology, and Laryngology in the Medical Schools of the United Kingdom (Herbert Tilley), 243
- Temporal Bone, A Diploëtic Type, and its Surgical Importance (Arthur H. Cheate), 305
- Gunshot Wound of, Two Cases (Sir Charles Ballance and Sir James Dundas-Grant), 357

Index

Section of Otology—*continued*

- Temporal Bone and Neck, Cirroid Aneurysm involving the (Norman Patterson), 439
- Tinnitus associated with a Rinolith (Lionel Colledge), 401
- Tuning Fork Testing, A Device for (E. A. Peters and R. Lake), 440
- Tympanic Exostoses (W. M. Mollison), 400
- Membrane, Destruction of, by Hot Fluid (Lionel Colledge), 354
- Vertigo, with Osseous Obliteration of Labyrinth (Richard Lake), 95
- Radical Mastoid Operation for (W. M. Mollison), 245, 354
- Vestibular Function, A Note on (Dan M'Kenzie), 302
- Vestibule, Some Anatomical Features of (Albert A. Gray), 246
- Scottish Otological and Laryngological Society :—
- Accessory Sinus Suppuration with Fatal Complications (J. S. Fraser), 443
- Air Passages, Upper, Sarcoma of, treated with Radium (A. Logan Turner), 442
- Antral Disease, Left, with Severe Trigeminal Neuralgia (W. S. Syme), 488
- Antrum, Right, and Postnasal Space, Tumour involving (G. A. Brand), 489
- Aphonia with Spastic Element, A Case of (P. M'Bride), 490
- Brain Abscess (T. Ritchie Rodger), 444
- Cerebellar Abscess (J. S. Fraser), 491
- Hernia (Ewart Martin and D. Watson), 444, 491
- Ear Disease, Chronic, Prevention of, Discussion on, 250
- Middle and External, Malignant Disease of, Right (J. S. Fraser), 251
- Unusual Injury of (Douglas Guthrie), 444

Scottish Otological and Laryngological Society—*continued*

- Epiglottitis, Cyst of (John L. Howie), 488
- Ethmoid, Left, Closed Empyema of, with Displacement of Eyeball (W. T. Gardiner), 442
- Ethmoidal Suppuration and Ethmoidal Mucocoele, Orbital Complication of (J. S. Fraser), 251
- Fauces and Pharynx, Lupus of (J. W. Leitch), 252
- Frontal Sinus, Left, Osteoma of (A. Logan Turner), 490
- Hearing, Electrical Aids to (J. Kerr Love), 252
- Hypo-pharynx, Malignant (?) Growth in (James Adam), 252
- Inner-Ear Deafness (J. S. Fraser), 491
- Labyrinth, Membranous, Demonstration of Specimens showing Comparative Anatomy of (A. A. Gray), 253
- Membranous, Note of Anatomy of (J. K. M. Dickie), 251
- Labyrinthitis, Meningitis and Death following Radical Mastoid Operation in Case with old Fracture of Base (J. S. Fraser), 444
- Laryngeal Pharynx, Trout Fly with Fishing Gut Attached, Removed from, by Indirect Method (A. Logan Turner), 489
- Larynx, Epithelioma of, Four Cases (J. S. Fraser), 251
- Intrinsic Cancer of (J. S. Fraser), 443
- Squamous Epithelioma of (W. S. Syme), 252
- Leontiasis Ossea, Skiagrams of a Case of (T. Ritchie Rodger), 491
- Menière's Symptoms, Two Patients with (James Adam), 252
- Mouth and Pharynx, Pemphigus of the (A. Brown Kelly), 252
- Nasal Accessory Sinuses, Acute Infection of, associated with Pachymeningitis Interna Hæmorrhagica (J. S. Fraser), 251

Index

Scottish Otological and Laryngological Society—*continued*

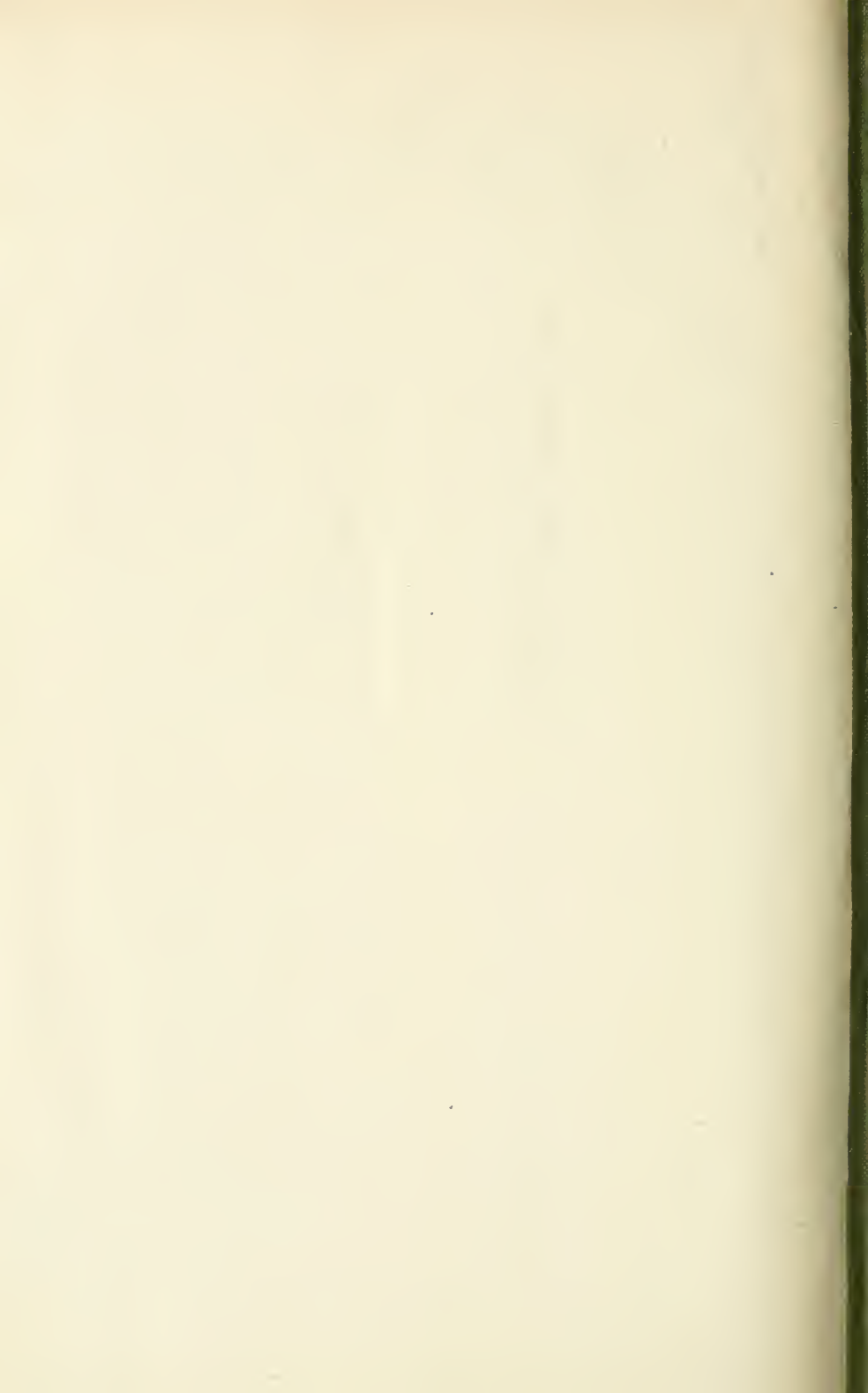
- Nasal Cavity, Epistaxis due to Leech in (W. T. Gardiner), 250
- Deformity, Traumatic, treated by Transplantation of Costal Cartilage (Douglas Guthrie), 444
- Nasopharynx, Carcinoma of (W. S. Syme), 252
- Nose and Nasopharynx, Malignant Disease of (W. T. Gardiner and J. M. Darling), 443
- Nystagmus produced by Inflation (James Adam), 489
- Oesophagus of an Infant, Collar Stud in (Douglas Guthrie), 491, 538
- Osteomyelitis, Cranial, following Sinus Suppuration (Neil Maclay), 490
- Otitis Media, Streptococcus Mucosus, followed by Septicæmia, Meningitis and Death (J. S. Fraser), 444
- Palate, Clonic Spasm of (W. S. Syme), 488
- Malignant Mixed Parotid Tumour of (W. S. Syme), 252
- Paralysis of, following Non-Diphtheritic Sore Throat (W. S. Syme), 488
- Soft, Unilateral Hypersecretion with Associated Paresis (A. Brown Kelly), 489
- Paralysis, Bulbar (J. S. Fraser), 492
- Left Recurrent Laryngeal (J. D. Lithgow), 251
- Pharynx and Larynx, Nystagmus of (A. Brown Kelly), 489
- Pulsating Vessel in, Case of (James Donald), 488

Scottish Otological and Laryngological Society—*continued*

- Pharynx, Yeast-Fungus of, A Case of (A. Logan Turner and W. R. Logan), 490
- Post - Cricoid Area, Malignant Disease of (A. Logan Turner), 250
- Rhinitis, Atrophic (James Adam), 252
- Rhinorrhœa, Cerebro-spinal (J. L. Howie), 252
- Rhinosporidium Kinealyi (A. Logan Turner and Prof. J. A. Ashworth), 490
- Rotation Tests, Demonstration Model (J. D. Lithgow), 253
- Sclerosis, Amyo-trophic Lateral, with Bulbar Involvement (A. Logan Turner), 250
- Sinus Thrombosis; Cavernous, and Meningitis (A. Logan Turner), 442
- Thrombosis, Sigmoid (J. Malcolm Farquharson), 443
- Sublingual Dermoid Cyst (Alex. Strang), 489
- Thyroidectomy, Partial, A New Method of performing the Operation of (James Harper), 488
- Trachea and Bronchial Tree, Specimen of (Neil Maclay), 490
- Stenosis of, following Bullet Wound (R. P. Mathers), 251
- Ventricle of Morgagni, Cyst of (T. Ritchie Rodger), 491
- Vocal Cord, Left, Fixation of, and Extreme Mobility of Left Arytenoid Eminence (W. T. Gardiner), 442
- Right, Epithelioma of (R. P. Mathers), 443







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